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THE MEDICAL SEQUELAE OF THE ATOMIC BOMB EXPLOSION

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The Army and Navy medical missions which investigated the results of the explosion of the atomic bombs in Hiroshima and Nagasaki, Japan, studied many aspects of the situation. In this article it will be impossible to review all the studies that were made; only two major subjects will be considered. The two most impressive features of the new type of bomb are: (1) the tremendous toll of casualties and (2) the syndrome of injury due to large amounts of gamma radiation.

In the bombed cities the Air Raid Defense authorities and the surviving members of the medical profession were confronted with an extremely large relief and rescue problem. The magnitude of their task is indicated by the following estimates (table 1):

TABLE 1.—*Atomic Bomb Casualties*

	Hiroshima	Nagasaki
Population	300,000	200,000
Dead	80,000	40,000
Injured	40,000	25,000
Patients in need of immediate care	85,000	50,000

Of the total number of casualties, 120,000 in Hiroshima and 65,000 in Nagasaki, not all were in need of immediate medical care. In each city about one sixth of the total number of casualties were killed instantly or died under circumstances in which no help was possible. They were burned to death by the direct heat of the bomb, were crushed under demolished buildings or trapped in burning débris. A somewhat smaller group, perhaps one seventh of the total number of casualties, escaped both mechanical injuries and burns but received a dose of gamma rays sufficient to make them become sick one to five weeks later. On the basis of these rough estimates, it can be said that approximately 85,000 persons in Hiroshima and 50,000 in Nagasaki required medical care on the day of the bombing.

The type of injuries that required treatment can be appreciated readily from a brief review of the characteristic products of the explosion of an atomic bomb. At the instant of their detonation high above the ground these bombs generated an incredible amount of energy, of four main kinds: mechanical, heat, light and ionizing radiation (alpha, beta and gamma rays and neutrons). There was some variation in the length of time that each form of energy was effective in the production of damage and casualties; but in general the duration of time was of the order of 1 second (table 2).

The mechanical energy produced was in the form of an air blast, or concussion, sufficiently strong to crush reinforced concrete structures directly beneath the bomb; to wreck steel-framed factories at distances as great as 4,700 feet (1.4 kilometers) from the center of the effect; and to demolish Japanese type wooden houses as far from the center as 8,000 feet (2.4 kilometers). In each of the bombed cities practically every building was damaged in some way; and windows were shattered and roof tiles blown off as far as 3.5 miles (5.6 kilometers) from the explosion.

The heat at the center of the exploding bomb has been described in the newspapers as greater than that in the center of the sun. No reasonable estimate of the actual temperature of the reaction has been released officially, but it was almost unbelievably great, judging by the effects. During the fraction of a second that it lasted, inflammable objects were scorched or set afire as far from the source as 11,000 feet (3.3 kilometers). Practically every person who was in any position in a line of sight relation to the flaming airburst sustained burns of the exposed parts of the body that faced the blast. The burn was of the flash type, so that almost any object or material that happened to be located between the source of heat and the victim protected parts that were under cover or in the shadow (fig. 1). Close to the center, however, the heat was so intense that burns occurred under clothing. An interesting relation to the color of such clothing was seen, and the skin under dark material was burned more severely than that under white cloth. Bizarre designs were produced on the skin of patients whose clothing was of patterned material. People received flash burns serious enough to warrant treatment at distances as far from the center of the explosion as 13,000 feet, or 2.5 miles (3 kilometers).

TABLE 2.—*Casualty-Producing Agents Resulting from Explosive Nuclear Fission in an Atomic Bomb*

1	Mechanical energy "blast"
2	Heat
3	Light (visible, infra-red and ultraviolet)
4	Ionizing radiation (alpha, beta and gamma rays) and neutrons

The bright light that accompanied the explosion has been described as many times more intense than that of the sun. It may be thought of as comparable to sunlight concentrated by a "burning glass," and in this

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This article is an abstract of a report submitted to the Surgeon General of the United States Army. The preparation of the report was the joint responsibility of Drs. Ashley W. Oughterson, New York; Shields Warren, Boston; Averill A. Liebow, New Haven, Conn.; E. Cuyler Hammond, New York; Henry L. Barnett, New York, and George V. LeRoy. Any opinions expressed are not necessarily those of all the colleagues, to whom, however, I am indebted for the use of the material.

sense it increased the amount of heat which caused the flash burns. Ultraviolet rays formed a part of the emission and caused typical conjunctivitis in some of the victims.

Fig. 1.—Example of extensive flash burn, some of which occurred under clothing. Note the sparing of the eyelids and the anterior surface of the neck.

Ionizing radiation, consisting principally of gamma rays harder than those produced by any electrical apparatus known, were emitted in amounts which can only be guessed. Alpha rays, beta rays and neutrons were also produced, but the relation of these to the production of casualties is not at all clear.

With this knowledge of the products of the complex reactions that accompanied the splitting of the nuclei of atoms of uranium 235 and plutonium 239, it is possible to make a reasonable prediction of the sort of injuries that the victims of the bomb would have. In the confusion that followed the bombing few clinical records were kept in the aid stations, but enough information has been collected to permit the following estimate of the several types of injury (table 3):

TABLE 3.—*Classification of Injuries Due to the Atomic Bomb*

Wounds	70%
Burns	65 to 85%
Radiation injury	More than 30%

Data obtained from one large military hospital provided an approximate breakdown of the major types of wounds (table 4):

TABLE 4.—*Classification of the Major Types of Wounds*

Fractures	11%
Laceration, mainly due to fragments of glass	37%
Contusions	52%

(Source: Ninoshima Hospital, Hiroshima)

These injuries resembled those that would be seen after hurricanes, earthquakes and to some extent after ordinary air raids. There were few blast injuries of the sort caused by high explosive bombs, however. Traumatic amputations, evisceration and general disintegration was infrequent. Few persons with extensive third degree burns lived long enough to receive medical attention, so that about 90 per cent of the burned patients in the aid stations and hospitals exhibited second degree burns. Less than 5 per cent of the burns were caused by the fires in damaged buildings and among the débris. The majority differed from ordinary flash burns only in the fact that the burned areas were darker in color than is usual.

The one unique type of injury caused by the atomic bomb was the syndrome due to gamma radiation—or simply radiation injury. It is not possible to state the precise dosage of gamma rays that any person or group of persons received in either Japanese city. It is equally difficult to estimate the amount of irradiation on the basis of the symptomatology because of the scarcity of information on the effect of large amounts of total body radiation in human beings. Guesses based on animal experiments are open to objections too numerous and too well recognized to be repeated here. The intensity of the gamma radiation emitted by the bombs decreased with the distance from the source in accordance with the law of the inverse square; and this is one of the two factors respecting dosage which can be discussed with certainty. The other is the well known ability of different types of matter to absorb gamma rays to a varying extent. Therefore, as might be expected, people inside heavily constructed buildings or in underground shelters were less severely affected than others at a comparable distance from the source who were in the open or in wooden structures. The amount of earth, brick or concrete necessary to give total protection from the gamma radiation of an atomic bomb at various distances is being studied intensively at present.

Fig. 2.—Spleen of man aged 24 who died five days after exposure to the atomic bomb. The field shows disappearance of lymphocytes from malpighian corpuscles, cytolysis of lymphocytes and fibrinoid changes in subendothelial portion of central artery; × 200.

It was difficult to obtain precise information about the early symptoms of patients with radiation injury. It appeared that the majority experienced nausea and vomiting several hours after the bombing and that the

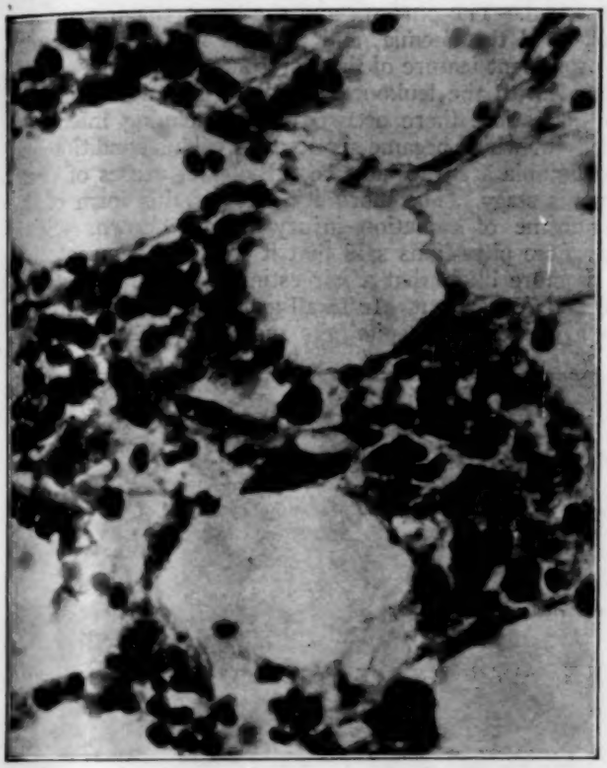

Fig. 3.—Bone marrow of man aged 39 who died seven days after bombing. The section shows a proliferation of reticuloendothelium and many plasma cells and lymphocytes. There are a few normoblasts remaining; × 650.

symptoms were of rather brief duration. The course of the individual patient after that time depended mainly on the amount of radiation that he had received. Because of the complications in the clinical picture caused by burns and wounds, the description of the syndrome of radiation injury which follows is based largely on a study of patients with no other type of trauma.

In those who received the largest doses of gamma rays, symptoms of fever and diarrhea were usually

TABLE 5.—*Onset of Symptoms of Radiation Injury*

	A Most Severe	B Severe	C Moderately Severe
Vomiting	Day of bombing	Day of bombing	Day of bombing
Fever	2-7 days	14-28 days	
Diarrhea	2-7 days	4-21 days	14-35 days
Leukopenia	2-7 days	7-28 days	7-28 days
Purpura	4-7 days	14-28 days	
Epilation	.....	7-28 days	14-35 days
Mucous membrane ulceration	.....	14-28 days	14-28 days
Anemia	.....	7-28 days	10-35 days
Death	4-10 days	10-42 days	30-90 days

present on the day after the bombing (table 5 *A*). Purpura appeared approximately four to seven days later; the patient failed rapidly and died suddenly. Examination of the blood showed a pronounced reduction or a total lack of leukocytes and blood platelets. The urine was said to have been red in some cases, but few reliable reports were found. At autopsy [1] the observations were those of a moderate purpura hemorrhagica with widespread petechiae and a hemorrhagic erosion of the mucosa of the gastrointestinal tract.

In one group of autopsies in this early stage, subarachnoid hemorrhage was found in 60 per cent of the patients. The bone marrow was pale, and the spleen and lymph nodes were small. Sections of spleen (fig. 2) and marrow (fig. 3) from typical cases are presented. Briefly, the important feature of these tissues is the disappearance of normal lymphocytes and marrow cells, so that only the stroma and the framework of the organs remain. There is evidence even at this early stage of a beginning of regeneration as seen in the proliferation of the reticulum. The general pattern of the observations in these cases resembles closely that described by Shouse, Warren, and Whipple [2] in dogs receiving large single doses of roentgen rays.

In the period between seven and twenty-eight days after the explosion of the atomic bomb symptoms developed in the majority of those affected by gamma radiation. The syndrome which appeared at this time was manifested by epilation, gastrointestinal disturbances (of which intractable diarrhea was the most frequent), purpura, fever, leukopenia and anemia (table 5 *B*). Associated with these primary phenomena were any of the complications which might be expected. Laryngitis, pharyngitis, tonsillitis and gingivitis developed in most of the patients. In the more severely afflicted these lesions, as well as lesions in the trachea, the bowel and the female genitalia, became progressive and severe necrotic ulcerations. This process differed in no way from that seen in agranulocytic angina from any cause. Petechia and purpura appeared in the skins of almost all the patients, and with the advent of the hemorrhagic tendency, epistaxis, melena, metrorrhagia and hematuria were regularly observed. Epilation (fig. 4) involved chiefly the scalp and was quite characteristic in appearance. The hairs of the crown fell out first, so that many of the victims appeared to have a monk's tonsure. The loss of hair was complete in only a few patients, and in the majority it began to grow again within two or three months' time. Epilation of other hairy parts of the body was infrequent. Laboratory studies at this time showed little that was abnormal except in the examination of the blood and bone marrow. Leukopenia was universal in patients with radiation injury when counts were made at an appropriate time. Values as low as 100 white blood cells per cubic

Fig. 4.—Example of epilation in a woman, showing almost total alopecia. The photo was made in October, twelve weeks after the bombing.

1. Protocols and complete descriptions of all the autopsy and clinical material obtained in Japan will be described in the Report of the Joint Commission for the Investigation of the Effects of the Atomic Bomb in Japan. To be published.

2. Shouse, S. S.; Warren, S. L., and Whipple, G. H.: II. Aplasia of Marrow and Fatal Intoxication in Dogs Produced by Roentgen Radiation of All Bones, J. Exper. Med. **53**: 421-445, 1931.

millimeter were reported, and the majority of the heavily irradiated patients had white blood cell counts below 1,500. Recovery appears to have been rare among patients whose white cell count was less than 600 per cubic millimeter. Examination of stained blood films at that time revealed mainly lymphocytes. Anemia was present in all such patients and became progressively more pronounced for a period of one to two weeks after the maximum depletion of the white count was observed. The purpura and the hemorrhagic tendency increased the anemia, and patients in whom this was a prominent feature of the syndrome did poorly. Associated with the leukopenia and the agranulocytic type of ulceration, there occurred overwhelming infections, many of which became septicemias. This condition and pneumonia seem to have been the chief causes of death in this stage. The mortality rate for this form of the syndrome of radiation injury is not known. Some Japanese physicians said that it was 100 per cent; but it is more likely that a fair estimate would be between 50 and 75 per cent. In small groups of persons treated in a university hospital the mortality rate was about 33 per cent. When this type of radiation injury developed in a burned or wounded patient, however, the prognosis was much worse because of the increased suppuration of the wounds. Sections of representative tissues from patients who died at this time are illustrated. The bone marrow (fig. 5), the spleen (fig. 6), the testis (fig. 7) and a section of burned skin (fig. 8) with no polymorphonuclear reaction are presented. The failure of spermatogenesis was constant in patients who were exposed to sufficient gamma radiation to produce clinical symptoms, and the extent of the process is evident from the illustration.

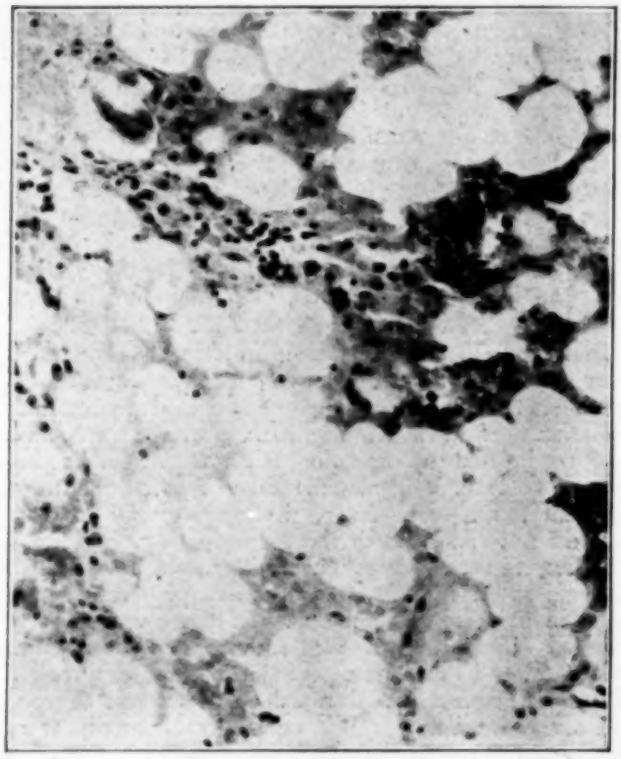

Fig. 5.—Bone marrow of man aged 29 who died twenty-nine days after the bombing. The section shows hypoplasia, a necrotic area and bacteria. The majority of the cells are reticulum cells, plasma cells and lymphocytes; × 230.

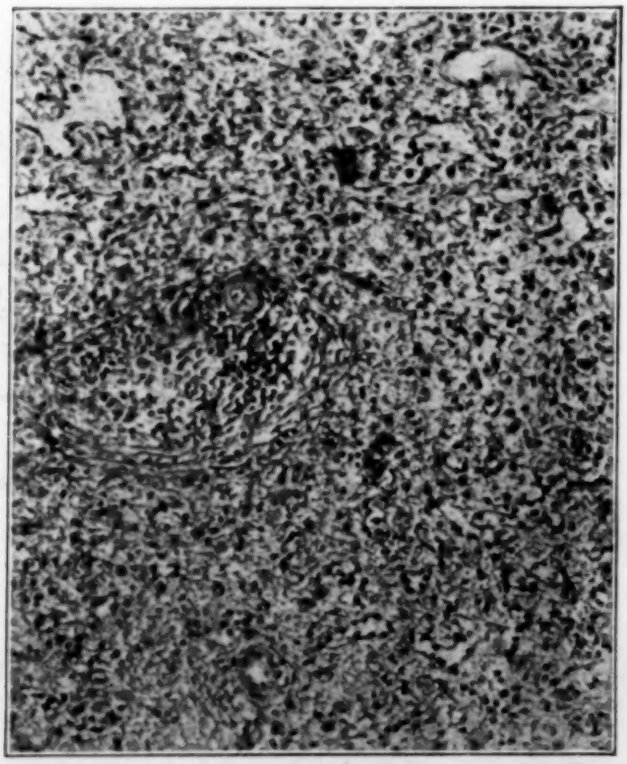

Fig. 6.—Spleen of woman aged 35 who died nineteen days after the bombing. The section shows atrophy of the lymphoid tissue, with karyolysis of some of the cells in the vicinity of the central arteriole. The arterioles show a deposition of hyalin-like material beneath the endothelium; × 160.

Fig. 7.—Testis of man aged 22 who died twenty-six days after the bombing. The section shows necrotic remnants of germinal epithelium and its derivatives in the lumens of tubules; edema of interstitial tissues, and hyaline subendothelial changes in small blood vessels; × 125.

A less severe form of the syndrome of radiation injury occurred. In these patients epilation, if it occurred at all, was observed during the third to fifth week after the bombing (table 5 *C*). The constitutional symptoms of fever, gastrointestinal disturbances and prostration

were conspicuously less serious. The other characteristic clinical phenomena in this group were weakness, malaise, diarrhea and mild inflammation of the mouth, gums and throat. Examination of the blood at an appropriate time revealed leukopenia, but white blood cell counts were seldom lower than 1,500 per cubic millimeter. The number of blood platelets was reduced, and anemia was a constant and often progressive feature. Frank ulceration of the inflamed mucous membrane was infrequent and tended to be transitory. Petechia appeared in rather small numbers of patients, and the hemorrhagic tendency was never extreme. Anemia was the most conspicuous element in the symptomatology; some of these patients never recovered but died two to four months later with an aplastic anemia. Sections from such a patient show poorly regenerating marrow (fig. 9) and testicular tissue (fig. 10).

The most important pathologic changes in the tissues may be summarized briefly. The bone marrow was

Fig. 8.—Skin of man aged 39 who died seven days after the bombing. The section shows burned skin, with necrosis of epidermis and outer layers of the dermis. Masses of bacteria are present, but there is no leukocytic infiltration whatever; × 50.

badly damaged, and there was an almost complete disappearance of all cells of the myelopoietic and erythropoietic series. However, in all but the most severely irradiated patients regeneration of the bone marrow was evident within seven to ten days after the injury. The type of tissue which regenerated varied considerably and frequently after three or four weeks the marrow appeared to be producing mainly macrophages, plasma cells and lymphocytes, with only insignificant numbers of definitive cells. In other cases a well-established myeloid and erythroid hyperplasia was evident at this time, and in tissues obtained later this process was often spectacular. The lymphatic organs all were badly damaged, and material from the earliest cases contains few or no lymphocytes in the nodes, the spleen and the thymus. Recovery of these tissues was evident after a few weeks, as a rule, but they never displayed the degree of hyperplasia that the marrow did. In many patients who died several months after irradiation, the lymphatic tissues still contained only a fraction of the usual number of adult-type lymphocytes. The testes

Fig. 9.—Bone marrow of man aged 31 who died fourteen weeks after the bombing, of bronchiectasis. The section shows gelatinous marrow from the rib, in which there is a large focus of regenerating cells replacing the fat; × 115.

Fig. 10.—Testis of man aged 31 who died fourteen weeks after the bombing, of bronchiectasis. The section shows complete cessation of spermatogenesis. The tubules whose basement membranes have not become thickened are lined with cells of Sertoli. The interstitial tissues are not hyperplastic; × 115.

were affected in the majority of men who received enough gamma radiation to cause symptoms. Spermatozoa were absent from the tubules, and most of the spermatogenic tissue was replaced by proliferating cells of Sertoli. As a corollary of this damage, changes of the type seen in castrated persons were apparent in the pituitary gland. The tissues of the female reproductive system were affected to a much smaller extent. The changes in the skin and in the hair follicles were prominent and resembled the type seen after treatment with roentgen rays.

The therapeutic problems that were presented by these patients with severe injury due to exposure to large doses of gamma radiation can be summarized quickly: The two major phenomena which endangered life were the gastrointestinal disturbances and the destruction of the hematopoietic tissues. The intense diarrhea and vomiting and the ulceration that occurred throughout the bowel created a serious situation. There is no doubt that many patients died from this cause alone with dehydration and acidosis. The damage to the bone marrow was even more serious, although it appears from histologic studies that regeneration of a sort commenced soon after the injury. Severe leukopenia which persisted for a period of one to three weeks was certain to facilitate the development of overwhelming infections in any part of the body. The inability of the leukopenic organism to localize such infections could result in the development of septicemia. The hemorrhagic state which accompanied the thrombocytopenia was capable of causing exsanguination from the ulcerated mucous membranes or from wounds as well as fatal hemorrhages in the central nervous system, the myocardium or the adrenal glands.

The proper objectives in the treatment of patients who have been exposed to the amount of gamma radiation emitted by an exploding atomic bomb are quite clear and can be stated simply (table 6):

TABLE 6.—*Therapeutic Objectives in Management of Patients with Radiation Injury*

1	Maintain fluid and acid-base balance
2	Control infectious processes
3	Combat hemorrhagic tendency
4	Correct the anemia

It does not seem unreasonable to believe that in the hospitals of the western world where plasma, electrolyte solutions, whole blood and penicillin are available in adequate amounts, a much lower mortality rate could be achieved than was observed in Japan. How satisfactory the thoroughly modern treatment of the syndrome of radiation injury might be is difficult to predict.

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ABSTRACT OF DISCUSSION

DR. VERNE R. MASON, Los Angeles: I should like to call attention to certain details about which Dr. LeRoy did not have time to elaborate. First, the changes in the bone marrow are not constant from day to day or week to week but represent a dynamic process that is going on. Dr. LeRoy has a large number of slides and a large amount of statistical material and, when he gets these all together, will make an amazing picture of what actually goes on in the bone marrow of persons who have had very large doses of gamma-ray radiation to the total body. Another factor may be of interest. In Hiroshima the last patient who died from severe leukopenia died on September 24. The bomb exploded on August 6. The early mortality, therefore, was of high degree and the total mortality became very large by September 24. As far as we could determine from very brief Japanese records of patients studied by Japanese doctors, there was a large number of patients who died in the bombed area soon after the explosion who showed no changes of the blood but died with fever, diarrhea and shock as the chief symptoms. It is our opinion at present that these persons died an acute death produced by an overwhelming dose of gamma radiation. I believe at the moment that Dr. LeRoy and Dr. Liebow have not completed their studies on this particular group of patients, on whom we have records of a small number of autopsies. As time went on, many who undoubtedly had developed leukopenic states earlier survived because they were fortunate not to develop the type of infection frequently seen in terminal stages of leukopenic states. Thus they may have survived the early phase of leukopenia and then later we saw a decreasing total mortality. But some of them ultimately died of an irreversible change in the bone marrow which led to an aplastic anemia. When the studies are completed (this is only a guess on my part) the time in which the leukopenic state developed in many of these patients will, I believe, practically correspond to the known life span of the white blood cell. Those who died of aplastic anemia later lived a period of time which will about correspond to the known life of the red blood cell. That, I think, is one of the important phases that will be brought out when these reports are completed.

POLIOMYELITIS

Neuropathologic Observations in Relation to Motor Symptoms

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There are few diseases which illustrate as well as poliomyelitis the importance of a quantitative point of view in evaluation of the variegated clinical patterns. In this infection the subclinical case grades into the clinical case and the nonparalytic into the paralytic with no sharp qualitative separations and with correspondingly wide variations of intensity of pathologic change in nervous tissues. Death itself may come as the result of an unusually intense involvement of localized vital brainstem centers, which are to some extent involved even in mild cases, or may follow widespread damage to many important centers without overwhelming any one of them. In such cases it is obviously impossible to say which straw it was which broke the camel's back. In the course of study of the pathologic material from 24 human cases, 13 of them previously described in detail,[1] it became increasingly clear that the use of pathologic material from such fatal cases in the correlation of symptomatologic data with lesions is extremely dangerous. One reason for this is the simple fact that death in poliomyelitis seldom occurs except as the result of such widespread and severe damage that important details are masked. Another reason is the uncertainty of judging whether lesions are sufficiently severe to significantly alter normal function. Neverthe-

Aided by a grant from the National Foundation for Infantile Paralysis, Inc.

From the Poliomyelitis Research Center, Department of Epidemiology, Johns Hopkins University School of Hygiene and Public Health.

Part of this material was presented at the Conference on the Structure and Function of Nerve and Muscle in Relationship to Infantile Paralysis at the State University of Iowa College of Medicine, Sept. 14, 1946.

The author is greatly indebted to several persons for their assistance in obtaining the human pathologic material. Cases 1 to 21 have been previously described,[1] and their sources have been acknowledged. Cases 29 to 40 occurred in Baltimore during the outbreak of 1944. Clinical data was made available by the generous cooperation of Dr. Margaret H. D. Smith and the members of the staff of the Sydenham Hospital; pathologic material was obtained with the kind assistance of Dr. Arnold Rich and the members of the staff of the Pathology Department of the Johns Hopkins Hospital.

1. Howe, H. A., and Bodian, D.: Neuropathological Evidence on the Portal of Entry Problem in Human Poliomyelitis, Bull. Johns Hopkins Hosp. **69**: 183, 1941.

less, numerous clinical observers since the time of Strümpell [2] and Medin [3] have attempted to correlate the symptomatologic manifestations of human poliomyelitis with cerebral as well as with spinal lesions. Some, like Wickman,[4] who gave to the problem a wealth of accurate observation and keen insight, made important contributions which are still not fully appreciated by modern workers in this field. My own interest was aroused from the direction of neuropathology, since anybody with a knowledge of the rudiments of neurology who examines cerebral sections from poliomyelitis patients is almost certain to wonder what are the clinical concomitants of the extensive lesions in the brain. Of course, when the patient has had a right-sided facial paralysis one will find severe neuron destruction and inflammatory changes in the right facial nucleus, but when one looks beyond the primary motor centers the clinical-pathologic correlations are much more obscure and complex. Added to the theoretic difficulties are the practical ones. In many fatal cases the patient enters the hospital in severe respiratory distress and cannot be adequately examined. This results, for example, in the extremely obvious discrepancy between recorded clinical involvement of cranial nerve musculature and the pathologic observations in corresponding cranial nerve nuclei in many patients (table 1). Moreover, many are, or become, so severely paralyzed that other symptoms are masked. Despite this difficulty it was decided that it might be instructive to study human material in the light of experience obtained with experimental material in order to compare the human disease with controlled experimental cases, and to determine how far it is possible to use human material for specific problems of pathogenesis and symptom analysis.

Three features of the pathologic picture of poliomyelitis must be clearly understood before one can make a satisfactory correlation of clinical symptoms with pathologic substrate. The first is the fact that all the evidence available shows conclusively that every case of poliomyelitis, human or experimental, exhibits lesions of the brain.[1] In the experimental animal this includes nonparalytic and abortive cases as well as paralytic cases. As far as the pathologist is concerned, all cases of poliomyelitis are encephalitic. The second fact is that in human poliomyelitis, as well as in most experimental cases, some parts of the brain seldom if ever are affected. These include primarily the entire cerebral cortex, except for the motor area, the corpus striatum except for the globus pallidus and the cerebellar cortex except for the vermis. In other words, the brain stem, as far forward as the hypothalamus and thalamus, bears the brunt of the cerebral pathologic changes in poliomyelitis. The third important generality is that great variation occurs in the severity of pathologic involvement of most central nervous system centers, but the same centers are generally involved in greater or lesser degree in almost all cases. I should like to emphasize this last point by stating that 2 fatal cases in which the patients did not primarily die of poliomyelitic infection did not differ in any fundamental regard from other fatal cases with respect to distribution of lesions in the brain (cases 9 and 40).

2. Strümpell, A.: Ueber die acute Encephalitis der Kinder, Allg. Wien. med. Ztg. **29**: 612, 1884; Deutsche med. Wchnschr. **10**: 714, 1884; Jahrb. f. Kinderh. **22**: 173, 1885.

3. Medin, O.: Ueber eine Epidemie von spinaler Kinderlähmung. Verhandl. d. internat. med. Cong. (1890) (no. 6) **2**: 37, 1891.

4. Wickman, I.: Beiträge zur Kenntnis der Heine-Medinschen Krankheit, Berlin, S. Karger, 1907.

THE ROLE OF BRAIN STEM CENTERS

Of those centers in the nervous system concerned with muscular function, the following commonly are involved to a greater or lesser degree in human and in experimental poliomyelitis: the motor cortex, the globus pallidus, the substantia nigra, the subthalamus, the red nucleus, the tegmentum of the midbrain, the cerebellum, the vestibular nuclei, the reticular formation of the pons and medulla oblongata, the motoneurons of the brain stem and spinal cord, the internuncial neurons in the intermediate and posterior columns of the spinal cord and the proprioceptive cells in sensory ganglions (table 1).

If all the motoneurons of the spinal cord were destroyed in every case of poliomyelitis, the problem would be simple. All the symptoms that might result from damage to these centers would be masked by the flaccid paralysis resulting from damage to one of them, the anterior column of the cord, which contains the lower motor neurons. It happens, however, that complete flaccid paralysis is infrequent as compared with the partial paralyses that result from irregular destruction of motoneurons in the cord. The problem, then, is to attempt to evaluate disturbances of function due to lesions of the upper motor neurons in a mixture of normal muscles and muscles weakened by lesions of the lower motor neurons. One can take as a point of departure in this problem two important facts which are clear from previously published work.

The first is that clumsiness, hyper-reflexia, spasticity and tremor of muscles have been demonstrated in the preparalytic stage of experimental poliomyelitis before virus or lesions could be demonstrated in the region of the spinal cord which corresponded to the affected muscles. Severe lesions, however, were always present at this time in centers of the brain stem in these cases.[5] A primary separation of the role of cerebral and of spinal cord centers in the production of motor symptoms can therefore be made from an analysis of experimental animals killed in the preparalytic period. It is interesting that Wickman mentioned the possibly analogous occurrence of increased patellar reflex in an otherwise normal leg in some cases involving paralysis of the arm.

The second fact is that experimental animals may have lesions in all the previously enumerated cerebral centers without manifesting any clinical evidence of muscular dysfunction. In fact, it has been shown that some animals with nonparalytic poliomyelitis do not have any lesions in the spinal cord but have a characteristic distribution of lesions in the brain.[6]

It is this last point which suggests an important further simplification of the problem. Apparently, severe destructive lesions are usually necessary to produce dysfunction at the clinical level, and one must therefore look for centers which are severely involved to locate the site of origin of clinical signs. The large margin of safety of some cerebral centers is a well known feature of central nervous system function.

With this point in mind, one can see that in experimental animals as well as in human beings, only a few centers in the brain are severely involved often enough

5. Bodian, D.: Experimental Evidence on the Cerebral Origin of Muscle Spasticity in Acute Poliomyelitis, Proc. Soc. Exper. Biol. & Med. **61**: 170, 1946.

6. Bodian, D., and Howe, H. A.: The Pathology of Early Arrested and Non-Paralytic Poliomyelitis, Bull. Johns Hopkins Hosp. **69**: 135, 1941; Experimental Non-Paralytic Poliomyelitis: Frequency and Range of Pathological Involvement. ibid. **76**: 1, 1945; Non-Paralytic Poliomyelitis in the Chimpanzee, J. Exper. Med. **81**: 255, 1945.

to suggest that they regularly play an important role in the motor symptoms of poliomyelitis. These centers in the series of 24 human cases, along with those less severely involved, are arranged in table 2 in a frequency series to show more graphically their relative importance as sites of pathologic change.

It is obvious that in the brain the centers most frequently damaged severely are the vestibular nuclei, the roof nuclei of the cerebellum and the reticular formation. It is extremely interesting that these three centers are interconnected by vestibulocerebellar and fastigiobulbar tracts, and two of them, the vestibular nuclei and reticular formation, are connected with the spinal cord. It is possible that they should be grouped together as a functional entity and that they therefore of experimental animals shows that in nonfatal cases one would not always expect the maximal effect. As a matter of fact, in some of the human cases in which there were no bulbar signs, and in which death was due to paralysis of respiratory muscles or to complications unrelated to the poliomyelitis infection, there was found a degree of involvement of brain centers comparable with that in mild paralytic or nonparalytic experimental cases. In 1 of these cases a boy aged 13 was recovering nicely from poliomyelitis when he succumbed to an attack of appendicitis fifteen days after the onset of his poliomyelitic infection. He had had muscular pain, a stiff neck and a stiff back early in the course of his disease, along with weakness of the arms. Unfortunately, he had not had a thorough

TABLE 1.—*Twenty-Four Fatal Cases*
Clinical Data in Relation to Pathologic Damage

Case	1	7	8	9	10	11	12	13	14	17
Sex	M	M	M	M	M	F	M	M	M	M
Age	9	26	6	13	27	8	26	7	7	23
Illness duration, days	8	7	5	15	6	10	9	24	5	3
Muscular pain	+	—	+	+	+	+	+	..	+	+
Stiff neck	+	..	+	+	..	+	..	+	+	+
Stiff back	..	..	..	+	..	..	..	..	..	..
First paralysis	Arms	Pharynx, larynx	Arms	Arms	Respiration	Pharynx	Arms	Legs	Arms	Legs
Other paralyses	Respiration	Palate	Respiration, pharynx	—	Legs, pharynx	Face	Respiration	Arms, respiration	Face, respiration	Respiration, abdomen
Pathologic damage										
Motor cortex	++	++	+++	++	++	—	++	++	++	+++
Pallidum	++	++	++	+	—	++	++	+	+	—
Substantia nigra	+++	+++	+++	+	++	+++	+++	+	++	+++
Subthalamus and midbrain	+++	++	+++	+	++	+++	+++	++	+++	+++
Vermis cerebelli	+++	+	+++	+	++	—	++	+	++	++
Cerebellar roof nuclei	+++	+++	+++	+	+++	+++	+++	++	++	+++
Vestibular nuclei	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
Reticular formation	+++	+++	+++	+++	+++	+++	+++	++	+++	+++
Motor nuclei, 3d nerve	—	+	++	—	++	++	+	+	+++	++
Motor nuclei, 5th nerve	+	++	+	+	++	+++	++	+	++	++
Motor nuclei, 7th nerve	++	+++	++	++	++	+++	++	+	+	++
Motor nuclei, 10th nerve	+	++	+	—	+++	+++	++	+	+	++
Motor nuclei, 12th nerve	+	++	++	+	++	++	+++	+	++	+++
Cervical spinal cord	..	+++	+++	++	..	..	+++	++	+++	+++
Thoracic spinal cord	..	..	..	..	..	..	..	..	+++	..
Lumbar spinal cord	..	+++	..	..	..	..	..	..	+++	..
Spinal ganglions	..	..	..	..	..	..	..	..	..	..

Plus signs indicate mild (+), moderate (++) and severe (+++) degrees of intensity of pathologic damage.

may play a joint role in modifying voluntary motor function and in regulating postural tone.[7] Magoun, in fact, has demonstrated experimentally the role of the reticular formation in modifying spinal motor activity.[8] Severe lesions in one or all of these centers may therefore superimpose on muscles weakened by imperfect spinal innervation varying degrees of altered suprasegmental control, which clinically might appear as varying degrees of hypertonia or hypotonia, ataxia, tremor and weakness.

Fatal human cases manifest the destructive changes in these centers in maximal form. Experience with the larger range of material made possible by the use neurologic examination before he died (case 9). In instances of this kind the only centers consistently showing severe damage have been the vestibular nuclei, especially Deiters' nucleus, and the reticular formation.

Table 2 is intended to show both the variation of intensity of pathologic damage in various centers and the frequency of occurrence of severe, moderate or mild degrees of damage in the series. Obviously, these grades of severity are subject to varying interpretation. The grade "severe" in any particular center indicates the greatest degree of damage in that center in my experience. In regard to the vestibular nuclei, cerebellar roof nuclei and the lower reticular formation, this term generally means destruction of at least 70 per cent of neurons. As a rule then, the severest damage occurs in the vestibular nuclei and in the reticular formation.

7. Allen, W. F.: Formatio Reticularis and Reticulospinal Tracts, Their Visceral Functions and Possible Relationships to Tonicity and Clonic Contractions, J. Washington Acad. Sc. **22**: 490, 1932.
8. Magoun, H. W.: Bulbar Inhibition and Facilitation of Motor Activity, Science **100**: 549, 1944.

THE ROLE OF THE CEREBRAL CORTEX

Cortical lesions are seldom severe and are largely confined to the motor cortex (areas four and six of Brodmann). It is doubtful that they are sufficiently intense to produce clinical signs, except perhaps in rare instances. However, it is not unlikely that damage to centers such as the motor cortex, globus pallidus, substantia nigra, certain midbrain centers and even spinal ganglions, although usually not sufficient alone to produce obvious motor dysfunction, as in non-paralytic cases, may be important if added to severe changes in the centers which have been shown to be primarily involved.

It may also be concluded from the relatively slight involvement of the cerebral cortex in poliomyelitis that

THE ROLE OF SPINAL CENTERS

In the spinal cord, as was to be expected, the severest lesions were always in the anterior columns. With severe involvement of the cord posterior and intermediate horns may also be heavily damaged, but such damage is more spotty in distribution than in the anterior horns, and the posterior and intermediate columns are never wiped out over whole segments as are the anterior columns at times. It is also to be expected, then, that when internuncial neurons are severely affected the neighboring anterior columns of the cord are so extremely damaged that flaccid paralysis is likely to be the only symptom referable to this region of the cord. The possibility remains, however, that internuncial neuron damage in the cord may contribute

of Human Poliomyelitis, 1939 to 1944

in Motor Centers of the Central Nervous System

18	20	21	29	30	31	32	33	34	36	37	38	39	40
M	F	M	M	M	M	M	M	F	M	F	M	M	F
31	32	11	15	10	15	3	7	37	14	2	9	7	24
2	5	6	9	5	8	5	7	12	3	3	6	2	17
+	+	+	+	..	..	..	+	..	..	..	..	+	+
..	+	..	+	..	+	+	+	+	+	+	+	..	+
..	..	+	+	..	..	..	..	..	..	+	+	..	..
Respiration	Legs	Arms	Palate	Pharynx	Pharynx	Neck, palate	Palate, pharynx	Pharynx, palate	Palate, pharynx	Face	Pharynx	Palate, pharynx	Pharynx
..	Respiration	Respiration	Pharynx	..	Palate, tongue	Arms, legs, abdomen	Respiration	Respiration, arms, legs	..	Arms	..	Face	Respiration, arms, legs
++	+++	++	+	++	+++	++	—	++	—	—	++	++	++
—	+	++	+	+	—	++	—	—	—	—	—	+	+
++	+++	++	++	..	..	..	..	+++	..	+	..	..	..
+++	+++	++	+	++	++	++	++	++	+	+	+	..	+
++	++	++	—	++	—	+++	+	+	—	—	—	..	+
+++	+++	+++	+++	+++	++	++	++	+++	+++	++	++	+++	++
+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
+++	+++	+++	++	+++	+++	+++	+++	+++	+++	++	+++	+++	++
++	+	+	—	..	..	..	..	..	..	..	..	..	..
++	++	++	++	+++	++	+++	+++	+++	++	++	+++	+++	+
++	++	—	++	+++	+++	+++	++	+++	+++	+++	+++	++	+
+++	+	+	+++	+++	+++	+	+	++	++	—	+++	+	+
++	++	+	—	++	+++	++	++	++	+++	+	+++	+++	+
+++	+++	++	..	+++	..	+++	..	+++	+++	+	+++	+++	+++
..	..	..	..	..	..	+++	+++	..	++	++	+	++	+++
..	..	..	..	..	+++	+++	++	+++	+	+++	+	+	+++
..	..	..	..	..	..	..	..	++	++	+	+	+	++

Minus signs indicate absence of lesions in semiserial sections representing a large sample of the nerve center involved.

residual psychic effects as well as spastic phenomena cannot be the result of specific lesions in the cerebral cortex. Moreover, other so-called encephalitic symptoms, including stupor, disorientation and coma, which occurred in some of these patients, were not associated with heavier than usual reaction in the cerebral cortex but rather with a greater intensity of reaction in the brain stem, which sometimes led to the production of small focal softenings (cases 12, 29, 30, 31, 37 and 38). It is the fortunate sparing of most of the cerebral cortex which should remind physicians that the patient may be intellectually and emotionally involved in the frightening experience of loss of motor power. It is problematic whether the severe lesions sometimes found in the hypothalamus may contribute in some instances to emotional difficulties.

to the motor dysfunction of muscles not completely paralyzed. The intermediolateral, or sympathetic, cell columns are surprisingly little involved, but in 1 of the cases there was considerable destruction of cells in these columns. Similarly, Clarke's column was usually spared and was never extensively involved.

I have seen no evidence in this material, experimental or human, that edema may play a conspicuous role in the production of paralysis. Whenever a severe inflammatory response occurs in a cord segment, the cord in such an area may show swelling of the freshly cut surface. In my experience, however, an inflammatory response severe enough to produce massive exudate in the anterior gray columns usually occurs when most of the anterior horn cells are already destroyed by virus action. In such cases there can be no question

of possible recovery from paralysis, since all or most of the motoneurons are destroyed. Severe paralysis may occur, however, without evidence of edema and in some instances without vascular changes or severe leukocytic infiltration in the cord. Such cases are conclusive in demonstrating that the paralysis of poliomyelitis primarily depends on a direct action of the virus on the motoneurons rather than on primary circulatory or inflammatory phenomena, as has recently been reaffirmed by Nelson.[9] Experimental evidence, which was apparently ignored by this author,[9] has been abundantly available to demonstrate the selective action of the virus on nerve cells.[10]

TABLE 2.—*Twenty-Four Fatal Cases of Human Poliomyelitis*

Intensity of Pathologic Damage in Motor Centers of the Central Nervous System

	Severe	Moderate	Mild	Absent
Motor cortex	4	15	1	4
Pallidum	0	7	8	9
Substantia nigra	8	5	3	0
Subthalamus and midbrain	8	10	5	0
Cerebellar roof nuclei	15	8	1	0
Vestibular nuclei	24	0	0	0
Reticular formation	20	4	0	0
Nuclei of 3d nerve	1	5	5	3
Nuclei of 5th nerve	7	11	5	0
Nuclei of 7th nerve	9	11	3	0
Nuclei of 10th nerve	7	5	9	2
Nuclei of 12th nerve	6	12	5	1
Cervical cord	14	3	1	0
Thoracic cord	5	2	1	0
Lumbar cord	6	3	2	0

In experimental as in human cases anterior horn cells may be destroyed either in large groups or in scattered fashion. Destruction does not occur suddenly, as in sectioning of the nerves, but follows a mortality curve in the motoneuron population over a period of several days or longer. Atrophy in experimental animals is proportional to the number of motoneurons destroyed; in human beings, atrophy of disuse may be superimposed on denervation atrophy to a greater extent than in the always active monkeys. Paralysis is also largely proportional to motoneuron destruction, if one means by paralysis loss of power in a maximally stimulated muscle which has not been allowed to atrophy due to disuse. Paralysis of voluntary movement is another matter, and one which certainly may involve more than lower motoneuron dysfunction, as has already been indicated. It obviously may occur without motoneuron destruction: for example, in cases of cerebral injury, in extreme fatigue and in hysterical conditions. It is not always recognized that ordinary testing of the muscles, using Lovett's or similar grading methods, although useful, measures not the potential power of surviving motor units but rather the complex act of performance. Further, such grading is useless for quantitative analysis of the symptoms due to motoneuron lesions because it is not a true scale but an arbitrary scheme, which gives only the sequence of increasing quantities. But these quantities are unknown because no unit of quantity is defined. In monkeys it has been found that the best way to determine residual muscle power of surviving motor units after the acute stage of the disease is to stimulate motor nerves or motor points of the muscles involved. It would seem desirable that this be done in selected human subjects to compare potential muscular power with voluntary performance.

9. Nelson, N.: Spinal Cord Circulation in Poliomyelitis, Science **104**: 49, 1946.

10. Hurst, E. W.: The Histology of Experimental Poliomyelitis, J. Path. & Bact. **32**: 457, 1929. Fairbrother, R. W., and Hurst, E. W.: The Pathogenesis of and Propagation of Virus in Experimental Poliomyelitis, ibid. **33**: 17, 1930. Pette, H.: Ueber experimentelle Poliomyelitis, Deutsche Ztschr. f. Nervenh. **116**: 163, 1930. Pette, H.; Demme, H., and Környey, St.: Studien über experimentelle Poliomyelitis, ibid. **128**: 125, 1932. Bodian, D., and Howe, H. A.: An Experimental Study of the Role of Neurons in the Dissemination of Poliomyelitis Virus in the Nervous System, Brain **63**: 135, 1940; Neurotropism and the Genesis of Cerebral Lesions in Poliomyelitis: An Experimental Study, Bull. Johns Hopkins Hosp. **68**: 58, 1941. Howe, H. A., and Bodian, D.: Refractoriness of Nerve Cells to Poliomyelitis Virus After Interruption of Their Axones, ibid. **69**: 92, 1941.

FACTORS IN THE RECOVERY OF MOTOR FUNCTION

Although any discussion of recovery factors must necessarily be speculative in part at this time, even a speculative analysis from the point of view of histopathologic study may be helpful in identifying the parts of the neuromotor apparatus which must be considered. Table 3 summarizes the role of these parts and the period of time during which recovery in each is probably most prominent. As already stated, the cerebral cortex is so little affected by the disease process that there is every reason to suppose that the patient can rapidly begin to relearn patterns of motor activity which formerly were smoothly and subconsciously regulated by now severely damaged brain stem mechanisms. It is generally agreed that motor reeducation is of the greatest importance in assisting recovery, and in this respect the cerebral cortex must play the dominant role.

Most of the brain stem centers concerned with motor function are damaged in varying degree in poliomyelitis, yet an evaluation of recovery from this damage must be phrased in exceedingly general terms until the precise contribution of each center in motor functions is better understood. It is difficult to believe that the damage to the brain stem does not affect motor performance even in some cases of mild paralysis, since such instances in experimental animals (6) and in the 2 cases of human poliomyelitis in which the patients died of other causes after fifteen and seventeen days (cases 9 and 40) showed considerable neuron destruction and infiltrative lesions in some brain stem centers, especially the vestibular nuclei and reticular formation. Recovery from such lesions should result from at least two processes: first, the recovery of neurons not damaged sufficiently to be destroyed and second, the rerouting of neuron-chain discharge pathways from interrupted primary paths to secondary alternative paths. The first process is probably completed in about one

TABLE 3.—*Factors in the Recovery of Motor Function in Poliomyelitis*

Part of Neuromotor System	Recovery Process	Period of Disease
Cerebral cortex	Relearning of complex neuromotor patterns	Entire convalescent period
Brain stem	1. Recovery of damaged neurons	First 4 to 6 wks.
	2. Rerouting of neuron discharge pathways	First 6 mos. or longer (?)
Spinal cord	1. Recovery of injured motoneurons	First 4 to 6 wks.
	2. Recovery of internuncial pathways	First 6 mos. or longer (?)
Peripheral nerve	Compensatory branching of surviving motor axons (?)[11]	Subacute and early convalescent period (?)
Muscle	Compensatory hypertrophy	Probably subacute and early convalescent periods

month, as is the case in the spinal cord; the second process probably is of longer duration, since it is a part of the relearning process.

In further assessing the pathologic factors which underlie the paralysis in poliomyelitis, it is important to note that positive evidence is now available for the well known supposition that reversible changes may occur in spinal motoneurons in the acute stage of the disease. In experimental and in human material intranuclear inclusions may be found in anterior horn cells of otherwise normal appearance in the subacute and convalescent periods. Since such inclusions are an accompaniment of severe cytoplasmic chromatolysis in the acute stage, it follows that these cells are recovering. This means that one component of muscular weakness in the acute stage may be a partial and temporary loss of function of some motor units, as contrasted with the commoner occurrence of irreversible loss of function of a varying number of denervated muscle fibers due to motoneuron destruction. The reversible changes in motoneuron cell bodies in experimental material are negligible after the first month or so (data to be published in detail separately). After this time recovery of function in muscles must largely depend on other factors (table 3). In the human material of this present study the entire spinal cord was available in 1 patient who survived longer than two weeks (case 40). In this case, in which destruction of anterior horn cells was extensive throughout all levels, over 90 per cent of the surviving motoneurons were normal in appearance and most of the others were only moderately chromatolytic.

Since lesions, sometimes severe, are found in the posterior and intermediate horns of the spinal cord as well as in the spinal ganglions, it is possible that spinal internuncial discharge pathways and reflex pathways may be injured sufficiently to contribute to motor dysfunction. Recovery of such mechanisms probably follows a course similar to that in the centers of the brain stem, since the two are intimately connected by ascending and descending pathways.

Experimental evidence, which has been recently presented,[11] that intramuscular branching of intact nerve fibers in partially denervated rabbit and rat muscles may supply some of the denervated muscle fibers has introduced a new possibility among the factors concerned in the recovery from poliomyelitis. However, whether this type of recovery actually occurs in poliomyelitis remains to be determined. Since chromatolysis of anterior horn cells, an excellent indicator of axon interruption, is not seen in significant amount after about one month following the onset of poliomyelitis, it seems likely that any regenerative phenomena involving the growth of axons or axon branches must occur far distal to the cell body, at least in the intramuscular portion of the nerve.

As far as the recovery of function due to intrinsic changes in muscle is concerned, compensatory hypertrophy probably plays a significant role. As in the case of the other recovery factors mentioned, however, its relative importance is difficult to assess because of the variety of factors involved in the recovery process.

In conclusion, it should be apparent that many of the symptoms of poliomyelitic muscular dysfunction mentioned in this paper were not recorded in the histories of the fatal cases studied histopathologically (table 1). The reasons for this have been discussed in the opening paragraphs, and the dangers of correlating symptoms in nonfatal cases with lesions in fatal cases should be manifest. Symptoms which were recorded in most of the cases, however, were muscular pain, stiff neck and stiff back. This material can offer no more than a confirmation of earlier observations of lesions of varying degrees of severity in meninges, spinal ganglions and posterior columns of the spinal cord to account conceivably for these symptoms. In view of the rather slight involvement of these areas in many cases, such an interpretation seems too facile. The common symptoms of stiffness of the neck and back are usually interpreted as being due to meningeal irritation. It is possible to speculate that the stiffness of neck and back may also be the result of the same disturbances of the brain stem which give rise to other phenomena of spasticity in poliomyelitis. This is suggested by the frequently occurring pattern of hypertonia in postural muscles in human poliomyelitis. The origin of this pattern should be explored experimentally. The origin of muscular pain in poliomyelitis and its possible relationship to spasticity of the muscles also requires further exploration.

It should be manifest that this account has been somewhat simplified in the interest of brevity and provocation. A more detailed analysis of available autopsy material has seemed to be unprofitable until such time as more complete pathologic studies in this disease and more complete studies of normal neuromotor mechanisms are available. To one who has examined material from many dozens of monkeys and chimpanzees in all stages and degrees of severity of clinical poliomyelitis, the paramount importance of variability of intensity of pathologic change is so apparent that almost any attempt at a statement of general principles seems an oversimplification of the problem at present. In addition to the variation of intensity of pathologic change which occurs in different persons one can definitely add the variation due to different strains of virus. One group of monkeys inoculated with a given dose of strain A will show mild degrees of paralysis and no signs of spasticity. Another group inoculated with the same dose of strain B will exhibit severe spasticity in the majority of cases and subsequent severe paralysis. Variations of this sort must be expected in different epidemics.

SUMMARY

1. An extensive histopathologic survey of 24 fatal human cases of poliomyelitis confirms older accounts in showing that all victims of poliomyelitis have lesions in the brain and that the severest lesions occur in the brain stem rather than in the cerebral cortex. Moreover, great variation occurs in the severity of pathologic involvement of most centers of the central nervous system, but the same centers are generally involved in greater or lesser degree in almost all cases.

2. Motor centers involved to a greater or less degree in human and in experimental poliomyelitis are: motor cortex, globus pallidus, substantia nigra, subthalamus, midbrain tegmentum, cerebellum, vestibular nuclei, reticular formation of pons and medulla oblongata, motoneurons of cranial and spinal nerves, internuncial neurons in intermediate and posterior columns of cord and proprioceptive cells in sensory ganglions.

3. Lesions in most of these centers are characterized by wide variations of intensity both in human and in experimental poliomyelitis. Lesions of moderate inten-

11. van Harreveld, A.: Reinnervation of Denervated Muscle Fibers by Adjacent Functioning Motor Units, Am. J. Physiol. **144**: 477, 1945. Weiss, P., and Edds, M. V., Jr.: Spontaneous Recovery of Muscle Following Partial Denervation, ibid. **145**: 587, 1946.

sity occur in most of these centers in symptomless or nonparalytic experimental infections.

4. Severe destructive lesions occur in the vestibular nuclei, the reticular formation and the roof nuclei of the cerebellum in most fatal human cases and in many paralytic experimental infections. These are the only brain centers which regularly contain extremely severe lesions. Since it has been shown [5] that spasticity, tremor and hyper-reflexia of leg muscles can occur in the preparalytic stage of experimental poliomyelitis in the absence of virus or lesions in the lumbar spinal cord, it is suggested that lesions in these centers of the brain stem may be primarily responsible for these symptoms.

5. The possibility is not excluded that the less regularly severe lesions in centers like the motor cortex, globus pallidus, substantia nigra, certain midbrain centers, internuncial neurons in the spinal cord and even spinal ganglions may contribute to motor dysfunction other than lower motor neuron weakness.

6. Histopathologic observations indicate that most nerve cells either are destroyed during the acute stage of a poliomyelitis infection or largely recover their normal appearance in about one month or less. Such recovery of reversibly injured lower motor neurons may be a primary factor in the early restoration of muscle function.

EXTRANEURAL GROWTH OF POLIOMYELITIS VIRUS

Its Significance Relative to Possible Methods of Prevention

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Attempts to demonstrate the growth of poliomyelitis virus in cells other than neurons have repeatedly failed [1] (1936). As a result the opinion has been prevalent that in the human body growth of the virus is limited to nerve cells. That this conclusion is premature and may well be wrong is indicated by a number of well established facts relative to (1) the amount of poliomyelitis virus in human feces; (2) the prolonged period of excretion of virus in feces; (3) the usually short period of growth of virus in the central nervous system of experimental animals, and (4) the frequent intestinal infection without apparent neurologic infection seen in work with Theiler's virus in mice.

The information available in regard to the amounts of poliomyelitis virus in feces casts considerable doubt on the idea that this virus grows only in nerve tissue. In tests with pooled fecal specimens from 25 patients, we have found sufficient virus in 5 mg. of feces to infect monkeys.[2] Others have reported infection of monkeys with as little as 0.01 mg.[3] (1945) of feces. The amounts of virus developed in the central nervous system vary greatly from strain to strain. No data are available that permit direct comparison of titers of the same strain of virus in the feces and in the central nervous system. However, it has been our experience that the smallest amount of infected spinal cord that will cause infection on passage is frequently about 1 mg. or 0.1 mg. When one realizes that the amount of feces excreted by a young adult is in the neighborhood of 150 to 200 Gm. a day and that the spinal cord weighs only 34 to 38 Gm.[4] (1920), it becomes apparent that the total amount of virus excreted in feces may approximate the amounts present in the spinal cord.

It has been a general experience with poliomyelitis, as with other virus infections of the central nervous system, that maximal amounts of virus are present in the central nervous system at the time of severest clinical symptoms, or just before that stage is reached. As the acute form of illness subsides in monkeys with experimental infections the amount of virus present, or the ease with which transmission is accomplished, declines rapidly.[5] One week after an animal has become afebrile the chances of obtaining virus from a specimen of spinal cord are greatly reduced.

This general observation is in striking contrast to the repeated finding of virus in feces for weeks after an acute attack of poliomyelitis. According to the data in the study of Horstmann, Ward and Melnick [6] (1944) 27 per cent of persons excreted virus during the fifth and sixth weeks after the onset of symptoms of poliomyelitis. It seems difficult to account for the continued excretion of virus in feces on the basis of contamination from the nervous system.

If the prolonged excretion of virus in feces is to be explained as coming from the nervous system, one would expect to find evidence of extensive and progressive damage to the nerve cells supplying the intestinal tract. It has been shown that the presence of virus in large amount in any part of the central nervous system is regularly associated with extensive damage to the neurones in that area [7] (1930). One does not find clinical evidence of progressively severe dysfunction of the intestinal tract in persons convalescent from poliomyelitis and excreting the virus. This lack of significant neurologic damage to the intestinal tract must be considered as evidence against the idea that poliomyelitis virus in the feces is derived from the nerve cells supplying the intestine.

Additional evidence in favor of the idea that the virus of poliomyelitis may grow in cells other than those of the nervous system is provided by studies of Theiler's virus of encephalomyelitis of mice [8] (1941). It is well established that this virus may be excreted in the feces of mice over long periods of time. Symptoms of neurologic damage probably do not develop in over 1 of several thousand mice infected with the virus to the extent that they excrete it in their feces. This is true in spite of the fact that the virus when introduced into the central nervous system causes a severe and frequently fatal disease resembling poliomyelitis of man.

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1. Sabin, A. B., and Olitsky, P. K.: Cultivation of Poliomyelitis Virus in Vitro in Human Embryonic Nervous Tissue, Proc. Soc. Exper. Biol. & Med. **34**: 357, 1936.

2. Unpublished experiments.

3. Pearson, H. E., and Rendtorff, R. C.: Studies of the Distribution of Poliomyelitis Virus: II. In a Small Town, Am. J. Hyg. **41**: 179, 1945.

4. Kopsch, F., in Rauber, A. A.: Lehrbuch der Anatomie des Menschen, Leipzig, Georg Thieme, 1920, pt. 6, p. 21.

5. Since this paper was submitted for publication, Bodian and Cumberland (Am. J. Hyg. **45**: 226, 1947) have presented detailed information showing the sharp decrease in amounts of poliomyelitis virus in the spinal cord following the development of paralysis.

6. Horstmann, D. M.; Ward, R., and Melnick, J. L.: Persistence of Virus Excretion in the Stools of Poliomyelitis Patients, J. A. M. A. **126**: 1061 (Dec. 23) 1944.

7. Fairbrother, R. W., and Hurst, E. W.: The Pathogenesis of, and Propagation of, the Virus in Experimental Poliomyelitis, J. Path. & Bact. **33**: 17, 1930.

8. Theiler, M.: Studies on Poliomyelitis, Medicine **4**: 443, 1941.

This virus is capable of spreading through the nervous system by way of neural pathways. It seems unlikely that virus could invade the nerve cells of the intestinal tract and grow there for the long periods of time during which it can be found in feces without invading the central nervous system. Extraneural growth of this poliomyelitis-like virus is not proved but is a strong possibility.

It is recognized that none of the evidence presented proves conclusively that the poliomyelitis virus grows outside of nerve cells. We have attempted, rather, to relate certain established facts that are extremely difficult to explain if it is assumed that the poliomyelitis virus grows exclusively in nerve cells. The concept that poliomyelitis virus may grow in the human body outside of nerve cells is not new[9] (1942). However, the absence of definite proof of such extraneural growth of the virus has been construed by some to mean that the virus can grow only in nerve cells. In view of the data that have been reviewed this conclusion seems unjustifiable.

This question may be of more than academic importance. If extraneural growth of poliomyelitis virus is the basis for the excretion of virus in feces, such extraneural growth may be a necessary first step in infection with the virus. We visualize the possibility that small amounts of poliomyelitis virus, gaining entry into the alimentary canal, might be incapable of invading the nervous system until preliminary extraneural growth of virus has occurred.

Should this be the case, it is apparent that one possible method of preventing poliomyelitis would be to prevent the extraneural growth of the virus. It would seem reasonable, for example, to investigate the possibility of utilizing the interference phenomenon, or cell blockade, in this regard.

If the virus of poliomyelitis grows outside the nervous system, different strains of the virus should vary in their capacity to invade from the extraneural location into the central nervous system. One might find strains totally incapable of invading the central nervous system, although fully able to grow abundantly in the extraneural site. A strain of this sort would be the type to use in any attempt to prevent poliomyelitis by employing the interference phenomenon.

The fundamental studies of this phenomenon with plant viruses[10] (1940), with bacteriophage[11] (1942) and with mammalian infections[12] (1944) have already borne fruit in practical control of one mammalian virus disease, canine distemper[13] (1946). In view of the discouraging results that have come from the use of ordinary methods of immunologic control (vaccines and serum therapy), it would seem that serious consideration should be given to the newer and fundamentally different approach provided by the interference phenomenon. The question whether extraneural growth of poliomyelitis virus is a necessary prerequisite to invasion of the nervous system then assumes critical importance.

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GROSS AUTOPSY OBSERVATIONS IN THE ANIMALS EXPOSED AT BIKINI

A Preliminary Report

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The unique opportunity to study the effect of massive ionizing radiations on experimental animals was provided by Operation Crossroads. The information obtained from observing the tissue response to stimuli provided by release of atomic energy is of medical, industrial and military interest. Radioactive and fissionable substances and their subsequent use presents many new hazards to health. Soon the methods for the prevention, diagnosis and treatment of ionizing radiation injuries should be familiar to all physicians.

Because of the character and importance of the Bikini experiments, aid in the planning and the execution phases was obtained from scientists in civilian life, the Army, Navy and Public Health Services.

It was considered that goats, pigs, white rats and guinea pigs would best meet the experimental needs. These animals were chosen because of the wide range of their species' resistance to ionizing radiations. Goats and pigs are approximately as sensitive to total body radiation as man, guinea pigs are more sensitive and rats are more resistant. Ease of handling and feeding and the hardiness of the species were other factors influencing our choice of animals.

MATERIALS AND METHODS

In test "Able," the air explosion, 176 goats, 147 pigs, 3,130 rats (5 to a cage) and 57 guinea pigs were placed on twenty-two target ships. Twenty-nine goats, 48 pigs and 687 rats were retained on board the laboratory ship as controls. The positions used for the placement of animals on the target ships covered the ship from masthead to below the water line and from bow to stern. Locations on each ship offered varying amounts of shielding against ionizing radiation varying from no protection to the protection afforded by 6 or 8 inches (15 to 20 cm.) of steel armor plate. The object was to expose animals with just such amounts of shielding as members of the ship's crew might have.

For test "Baker," the shallow underwater explosion, 10 pigs were placed on each of two ships and 50 rats were placed on each of four ships in such a manner as to protect them from air, water and heat waves, yet afford only minimal shielding from ionizing radiation.

Six boarding teams, which had placed the animals prior to the tests, reentered the target area as soon after the tests as the ships were pronounced safe for boarding. The animals were returned to the laboratory ship, where they were individually examined for radioactivity and treated as indicated. The living were placed in special pens and cage racks for observation. The dead were removed to the autopsy room for dissection and study.

Read in abbreviated form before the meeting of the American Association of Pathologists and Bacteriologists, Chicago, May 16-17, 1947.

From the Naval Medical Research Institute, National Naval Medical Center, Bethesda, Md. (Commander Tullis) and New England Deaconess Hospital, Boston (Captain Warren).

Three hundred rats, 100 from each of three target ships, were killed in groups of 30 a day beginning four days after test "Able." Also from time to time control goats, pigs and rats were killed for study. Tissue blocks from all organs of the animals autopsied were preserved in 10 per cent neutral solution of formal-

Fig. 1.—Mortality in rats—test "Able."

dehyde and in Bouin's solution. Microscopic sections of these tissues are being prepared at the Naval Medical Research Institute.

RESULTS

The atomic bomb contains all the explosive characteristics of trinitrotoluene magnified many times. In addition it produces ionizing radiations, which distinguish it from all other bombs.

The general mortality percentages for the animals exposed in the bomb tests (figs. 1 and 2) take into account deaths from all phases of the destructive power of the atomic bomb including air blast, thermal radiation, secondary fire and ionizing radiation. Loss by drowning is not included. It was not always possible to rule out certain factors which may have played a part in bringing about death, but in the Bikini tests ionizing radiations caused the greatest percentage of mortality. The animals placed for the shallow underwater explosion test were shielded from all effects of the blast except that of ionizing radiation. The mortality percentages in figure 2 represent deaths due to that cause only.

The animals which died from the effects of total body radiation died in the acute phase of the disease, and no deaths due to latent or chronic effects have been observed to date. Almost 100 per cent of the deaths occurred within one month after the tests. The greatest peak in the mortality occurred within two weeks. This was true in both tests and in all four species of animals.

The typical clinical picture of a goat or a pig, and to a lesser degree a rat, exposed to a lethal but not overwhelming dose of ionizing radiation showed an animal which at first looked and acted normally. The total white blood cell count decreased within a few hours, chiefly because of a fall in the number of lymphocytes, but within a few days the segmented cells also decreased. At the end of a week or ten days the red blood cell count showed a corresponding decrease. At that time or a little later the clotting and prothrombin times increased, clot retraction was altered and in some instances the bleeding time was increased.

After the first two or three days of apparent well-being of the animals there developed diarrhea, which in a week became bloody, tarry or both. They stayed on their feet but became hyperirritable and even belligerent at times. They took water but often refused food. As the anemia progressed, especially if the diarrhea persisted, weakness developed and the animals spent considerable time lying down. In the large animals, rapid panting respirations often were present from the first day or two after exposure to the bomb burst. They usually responded when approached, struggled to their feet and even walked, until suddenly they died. Death often was unexpected from clinical observations alone. When the diarrhea subsided and the respiratory distress abated the animals appeared to improve clinically, but when the tolerance dose of ionizing radiation was exceeded death was inevitable.

The gross pathologic lesions in goats and pigs which had died from the effects of overexposure to ionizing radiations were similar and were of three main types: hemorrhage, secondary infection and degenerative changes.

The earliest and most consistent lesions to appear were associated with hemorrhage, which became evident, particularly in the goats, pigs and guinea pigs, on or after the third day following exposure. The hemorrhagic lesions involved almost any or every tissue in the body. In the early stages of radiation injury dilatation and congestion of the small blood vessels of brain, heart, lungs, mesentery, bowel and subcutaneous tissue were the only observations. Later a few scattered petechiae were found in these tissues along with the hyperemia. In the animals which survived for five to ten days many petechiae expanded to ecchymoses or, occasionally, to small hematomas. The sites most frequently involved, singularly or in combination, were the heart and the gastrointestinal and genitourinary systems.

In the animals which had received large amounts of ionizing radiation, among both goats and pigs, petechial hemorrhages in the renal cortices and pelvic walls were common (fig. 3). Gross hemorrhage with blood clots in the kidney pelves was seen occasionally in the larger animals. The genitourinary lesions in guinea pigs were confined to petechiae in the renal substance, but this was rarely seen in the rats.

The diaphragm over the spleen was a favorite location for rather extensive extravasation of blood in goats and pigs. In guinea pigs widespread hemorrhage into the muscles of the back, the abdomen, the legs, the chest

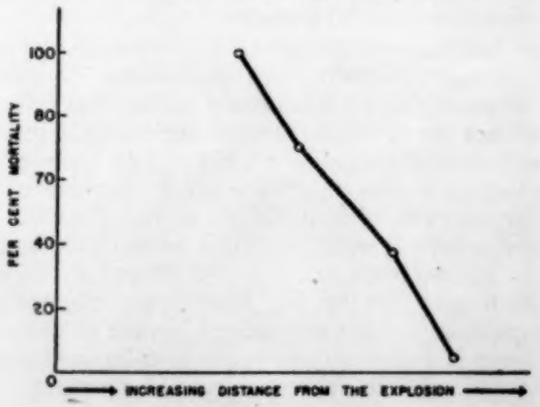

Fig. 2.—Mortality in rats—test "Baker."

and the diaphragm was a fairly constant and decidedly striking manifestation of radiation. This intramuscular hemorrhage was the most characteristic lesion in the guinea pigs. It was practically never seen in the rats but occasionally was seen in the goats and pigs.

In all species the lymph nodes, particularly of the cervical, preaortic, mesenteric and inguinal regions were

characteristically hemorrhagic. Usually the nodes were enlarged, but their chief distinguishing feature was their dark red color, interspersed on the cut surface with patches of moist gray lymphoid tissue. They were uniform in appearance in all regions of the body. The brain and meninges sometimes contained petechiae,

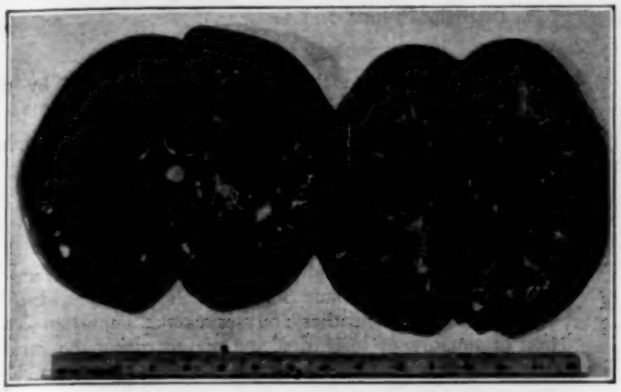

Fig. 3.—Hemorrhage into the cortex, medulla and pelvis of the kidneys of a pig exposed in test "Baker."

and the skin, particularly in the "Baker" pigs, frequently showed purpuric lesions.

In about 80 per cent of the deaths, the lungs were mottled dark red and pink; the cut surface was wet and sometimes dripped blood-stained fluid, and the bronchi were filled with abundant pink or white froth. The dark red patches were irregular but usually sharply outlined and firm, resembling areas of hemorrhagic lobular pneumonia. Lobar consolidation was seldom seen.

The gastrointestinal tract presented a third type of lesion manifested chiefly in the large intestine. In the first three or four days after exposure, acute ulceration of the large intestine sometimes occurred in the absence of gross hemorrhagic lesions. The ulcers were small, irregular and often elongated in the longitudinal axis of the bowel (fig. 4). They were always superficial and never extended deeper than the submucosa. Covering the surface were tenacious, feces-stained, fibrin membranes, which were removed with difficulty, leaving a raw and moist surface beneath. Later similar ulcerations were surrounded by swollen hemorrhagic mucosa. Although the layers of the bowel external to the mucosa were usually edematous and hemorrhagic and were often spotted with petechiae, there was no evidence of perforation or peritonitis. The stomach sometimes contained similar ulcerations. Usually the small intestine showed petechial hemorrhages in the muscular layer, but the mucosa appeared normal. However, the pigs exposed in the "Baker" test sometimes showed ulcerations in the mucosa of the entire small intestine as well as in the stomach and large bowel. The ulcerations of the small intestines were accompanied by less edema and usually were not covered with a fibrinous membrane. A striking feature in all these ulcerations was the absence of gross purulent reaction.

In the tonsils shallow, fibrin-covered, irregular ulcerations similar to those seen in the colon were fairly common. The ulcerations appeared to spread from areas of petechial hemorrhage.

The liver, spleen and adrenals were essentially normal. The bone marrow sometimes was pale and sometimes hyperemic without obvious relation to the general disease state of the animal.

SUMMARY AND CONCLUSIONS

Clinical observations are readily correlated with the pathologic observations. Severe radiation sickness is associated with depression of the hematopoietic centers and increased capillary permeability. Capillary dilatation and probably damage to intercellular cement substance combine to bring about extravasation of blood which is recognized clinically as petechiae, ecchymoses and, sometimes, small hematomas. Degenerative changes may result in ulceration of the gastrointestinal tract which, when it occurs, causes diarrhea and is responsible for considerable hematic loss. Loss of blood into the tissues and externally is largely responsible for the anemia which appears in the second week. Action of the ionizing radiations on the circulating white blood cells is possible and may account in part for the early leukopenia, but the chief factor in the development of continued leukopenia or agranulocytosis is the damage to the bone marrow.

Anemia and leukopenia are responsible for the weakness, irritability and lowered resistance to infection. Degeneration of tissue leads to absorption of toxic breakdown products from the injured cells.

Death in the first month after exposure to lethal amounts of ionizing radiation is apparently the result of three factors working singly or in combination: anemia, secondary infection and/or toxemia associated with the degeneration of tissue.

In the Bikini animals nearly 100 per cent of the mortality due to ionizing radiation injury occurred within the first month, with the greatest peak at two weeks after exposure. The tests were designed to study all phases of the destructive power of the atomic bomb, but ionizing radiations accounted for the great majority of deaths.

Severe burns were few in number. The exposed animals were well protected by their fur. In those cases in which anti-flash-burn cream was applied to

Fig. 4.—Hemorrhage and ulceration in the mucosa of the large intestine of a pig exposed in test "Baker."

the depilated skin of the animals full protection was afforded.

Air blast injuries will be the subject of a special report, but it may be stated here that they were not common causes of death.

From the data presented several conclusions seem justified.

1. Ionizing radiations of the atomic bomb are lethal for goats, pigs, guinea pigs and rats exposed to them under varying conditions.

2. The gross pathologic observations are fairly characteristic and similar in the four species studied.

3. The sensitivity to ionizing radiations varies somewhat among the four species, the guinea pigs being by far the most sensitive, the pigs being slightly more sensitive than the goats and the rats comparatively resistant.

4. The flimsiest of shielding seems to afford ample protection from thermal radiation, but heavy armor does not always protect from the ionizing radiations.

5. An underwater atomic bomb explosion is more lethal than an air explosion, since the spray which showers down on the ships in the vicinity carries with it fission products which contaminate their surfaces, cannot be removed easily and remain dangerously radioactive for long periods of time.

TREATMENT OF INFECTIONS OF THE NECK

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A discussion of the treatment of infections of the neck should entail the following: first, the fascial planes of the neck; second, the area from which the infection arises; third, the types of organisms which are present, and fourth, the medical and surgical treatment of the infection.

The fascial planes of the neck

The fascia is a sheet or band of tissue which invests and connects muscles and other functional structures, such as neurovascular bundles, with the viscera. The fascia consists of a waxy matrix of fibrous and fatty fibroareolar tissue cells in various proportions as to cellular components, depending on the position and functional requirements.

Genetically, the fasciae are composed of the same type of connective tissue cells which are utilized in the formation of the supportive framework and the covering of muscles, blood vessels, nerves and viscera. The fasciae are structurally identical with the periosteum and muscle tendons and with the supportive framework of the serous membranes. As a matter of fact the fasciae cover and blend with the external coat of all the important organs of the body; namely, blood vessels, nerves, bones, muscles and most of the viscera.

The surgeons are familiar with the fascial interspaces as lines of cleavage. The fascial interspaces also serve as paths of least resistance for the spread of infection, neoplasms or foreign bodies. Despite their well known clinical importance the fasciae are less well comprehended than any other structures studied in gross anatomy. The textbook descriptions of the fasciae are, as a rule, based on observations in the cadaver and are, therefore, complicated and variable.

The fibroareolar tissue is relatively soft, pliable and elastic, whereas in the cadaver the fasciae are pultaceous and of suetlike consistency. It must be remembered that the technic of surgery requires exposure with minimum trauma and display of anatomic structure.

From the Department of Otorhinolaryngology, Indiana University School of Medicine.

Read before the Section on Laryngology, Otology and Rhinology at the Ninety-Fifth Annual Session of the American Medical Association, San Francisco, July 3, 1946.

One might criticize the conception of the fascia which is ordinarily presented to the student as purely academic and based on dead anatomy.

The following are some of the difficulties encountered in understanding the fascia:

1. Discrepancies in description by different authors (American, English, French and German).
2. Variations in terminology.
3. Failure to appreciate the important part played by the fascia in the mechanical functions of the body.
4. Failure to appreciate fundamental morphologic principles.
   a. The primary tissues are primarily supportive.
   b. All connective tissues are derived from the mesenchyma, and all are modifications of the fibroblast or the fibril connective tissue cells.
5. The so-called interfascial spaces are filled or made up of filmy fatty fibroareolar tissue which infiltrates in the so-called tubular sheathes and serves the important function of support, of insulation and of separating the various functional units. The spaces are of various sizes and contain connective tissue elements of various degrees of density depending on functional requirements.

At the risk of oversimplifying the problem of the connective tissues of the body it should be emphasized that, after all, the connective tissues have only two functions; first, they tie structures together and second, they keep structures apart.

It is true that pus tends to gravitate or progress along the paths of least resistance, which is through the substances of the soft supportive intermembranous spaces.

The area from which the infection originates

The area from which the infection originates is of prime importance, and careful inquiry into the history of the portal of entrance is important for the reason that evidence of inflammatory reaction may have disappeared by the time there is evidence of the infection of the neck.

In case of infection in the neck from dental extraction the secondary sequelae of infection in the neck may occur ten days to two weeks after extraction of the tooth. On the other hand, the infection in the neck may follow the extraction immediately.

The tonsils, cervical vertebrae, nasal sinuses, temporal bones, salivary glands, esophagus and respiratory tract and injuries about the hypopharynx, larynx, trachea and esophagus are often the sources of infection in the neck. Fracture of the sinuses, especially the maxillary, or fracture of the mandible is frequently followed by cervical infection. The infection in the neck may be relayed from any of these areas.

If the source of the infection can be determined it will give a clue as to the course the infection may follow and the probable point of localization.

A peritonsillar abscess, following tonsillitis, is one of the commonest infections of the neck. This may have as a complication a subtonsillar abscess, a parapharyngeal abscess or a pharyngomaxillary abscess.

The next most commonly observed cervical infection is that of the pharyngomaxillary space following the removal of tonsils under local anesthesia. This may be opened and drained intraorally or externally by using the Mosher technic. An infection in this region may extend downward by way of the pharyngomaxillary space and involve the pretracheal fascia, thereby producing an edema of the larynx which in turn may result

in an extremely grave situation. It may burrow its way into the carotid sheath and break through, causing an internal jugular thrombosis.

Mastoid infection may reach the neck by at least four different routes. First, a Bezold's abscess may follow the posterior belly of the digastric muscle by breaking through the digastric groove and reaching the carotid sheath, thereby causing an internal jugular thrombosis. Second, infection in the petrous pyramid of the temporal bone may break through at the inferior surface following under the periosteum, reaching the prevertebral space and laterally the pharyngomaxillary space, then into the carotid sheath and involve the internal jugular. Third, an infection may break through the zygomatic cells and involve the pharyngomaxillary fossae. Fourth, an infection may break through to the neck by way of a lateral sinus, when thrombosed, which may extend directly into the carotid sheath.

The types of organisms which are present

If a smear or culture can be obtained early from the site in which the original infection is located, there is a much better chance of providing early medical therapy. If neither of these can be obtained a knowledge of the organisms which are habitués of this area must be had, or the patient must relate just what occurred which may have been responsible for the start of the cervical infection. The most commonly found types of organisms in infections of the neck are the streptococcus, staphylococcus and, occasionally, the pneumococcus. Other types are Borrelia vincenti, Clostridium perfringens and Mycobacterium tuberculosis.

In the treatment of infections of the neck before the formation of pus, chemotherapy is turned to; that is, sulfonamide compounds, penicillin or streptomycin. The relative value of each of these drugs is shown in table 1.

The medical and surgical treatment of the infection

The local application of sulfonamide drugs in cervical wounds of the lacerative type after débridement was reported to be of great value during World War II.

When there is evidence of a beginning purulent infection of the neck and there is a primary focus of infection, this must be drained in order to give chemotherapeutic agents a better chance to relieve the cervical infection.

TABLE 1.—*The Relative Value of Sulfonamide Drugs, Penicillin and Streptomycin in Infections of the Neck*

	Sulfonamide Drugs	Penicillin	Streptomycin
Streptococcus	++++	+++++	0
Pneumococcus	+++	++++	0
Staphylococcus	++	+++	+ − ?
Borrelia vincenti	0	++++	+ −
Clostridium perfringens	+ ?	++	0
Mycobacterium tuberculosis	+	0	++ ?

If, after draining or controlling the local site of the infection, with both medicaments and surgical drainage, the infection in the neck gives evidence of going on to localization with the formation of pus, there is but one thing to do, and that is to institute surgical drainage.

The areas in which pus is most likely to form are shown in table 2.

The early recognition and proper management of these abscesses calls for a thorough knowledge of the anatomy of the regions concerned as well as surgical judgment and skill. The seriousness of these conditions lies in their tendency to spread along fascial planes and invade the thorax with a resulting mediastinitis.

Relationships are often lost due to the swelling from infection, and tissues are matted together and distended. The surgeon under these conditions must allow for great displacement and often confusing changes in tissue appearances caused by the presence of the abscess. Thus pure anatomic relationships become disturbed.

TABLE 2.—*Spaces of the Neck in Which Potential Infection May Occur*

Submental	Submaxillary Space	Pharyngomaxillary Space
Teeth	Teeth	Retropharyngeal abscess
Submaxillary space	Suppurating lymph glands	Peritonsiliar abscess
	Abscess of submaxillary gland	Post-tonsilectomy abscess
		Suppurating jugular lymph nodes
		Teeth

Prevertebral Space	Submental and Submaxillary Space
Infected lymph gland	Infection from wounds
Necrosing tuberculous vertebrae	Teeth causing Ludwig's angina

One type of cervical infection which especially warrants mentioning is Ludwig's angina. This is a phlegmonous induration of the cellular tissues of the neck which produces a wooden-like hardness on which no impression can be made by palpation.

Anatomically the site of this induration is in the cellular tissues in the floor of the mouth and submaxillary region, usually below the mylohyoid muscle; it frequently extends into the sublingual region and is limited laterally by the horizontal portion of the mandible and inferiorly by the hyoid bone. The treatment of this lesion is radical and is as follows: Under local anesthesia a wide surgical horizontal incision is made, and the wound is left open with free drainage.

CONCLUSIONS

In the treatment of infections of the neck the following considerations are important:

1. It is necessary to know the fascial planes of the neck.
2. The site of the original infection should be discovered.
3. A knowledge of the bacteriologic cause of the infection is essential.
4. The type of medical treatment which is to be employed should be more or less specific for the organism present.
5. The selection of the proper time to perform surgical drainage is important.

ABSTRACT OF DISCUSSION

DR. J. M. BROWN, Los Angeles: I agree with the principles laid down in this paper, especially the anatomic part. I should like to mention a few etiologic factors that have a bearing on the treatment. One is the invasion of the connective tissue in the various fascial planes that Dr. McCaskey has mentioned, such as lesions following the extraction of teeth and abscesses coming down from the petrous portion of the temporal bone. When this condition is present in the tissues of the neck, the patient is decidedly sick and needs immediate attention. The second factor is that frequently a lymph node is infected for an indefinite time and then breaks down. This is a slower process, but one must be on guard and the minute the node has broken down, immediate drainage is to be instituted, thus preventing the cellulitis. The third is that of phlebitis and thrombophlebitis, which have few local symptoms. A serious phlebitis may be present with few local manifestations. This also requires immediate attention surgically because of serious complications

by emboli. When a patient is admitted to the hospital with a cervical infection, it is first determined if there is any laryngeal obstruction. If it is pronounced, a tracheotomy is performed at once and a large dose of penicillin is given. If the dyspnea is of moderate severity and it is believed that pus is present in the infected area, the pus is evacuated before the performance of a tracheotomy, and in most instances the latter is found necessary. The chief anchor in these patients is penicillin. Before penicillin could be obtained, sulfonamide drugs were used and found to be of little value. Penicillin is of distinct value in stopping the cellulitis, but it will not absorb pus. As soon as one is satisfied that pus is present, the infection should be drained; local anesthetic is preferable. A general anesthetic is given only when an intratracheal tube can be used, which is not often. I have found that early incision and drainage of the affected area, plus the administration of penicillin, is the best treatment. I should like to mention one other type of neck disturbance having all the appearances of a Ludwig's angina. Three patients were admitted to the Los Angeles County Hospital with difficulty in respiration and swelling in the neck and mouth, similar in appearance to a Ludwig's. There was no tenderness or boardlike feeling and no elevation of temperature. On physical and laboratory examinations the patients were found to have nephritis, and the cervical and oral swelling was a part of the renal disease.

Dr. Rea E. Ashley, San Francisco: General immunity and local tissue immunity play an important part in preventing the extension of these infections. Certain physiologic and anatomic barriers also tend to limit the spread of these infections to the adjacent and deeper tissues of the neck. The lymph system is highly developed in the neck, and the lymph nodes constitute a series of traps for invading bacteria. Various layers of cervical fascia act as mechanical barriers to extension of the infection. Prophylaxis is most important. Early use of the sulfonamide compounds at the original site of the infection and early administration of large doses of penicillin at the first sign of complication will frequently prevent or stop extension of the infection. Once the infection has broken through, however, and symptoms of deep suppuration develop, a critical stage exists which will tax any surgeon's ingenuity and demand his best surgical judgment. No rule of thumb can be set up as to the best time to operate. That is a matter of surgical judgment. Once the decision has been made, however, and the point of incision decided on, the surgical intervention should be radical and deep. Dr. McCaskey has given a clear and concise definition of fascial interspaces and has rationalized the method by which infections spread into the deep tissues of the neck. He has also outlined the general treatment so well that little can be added in the way of discussion. The history will frequently give a clue to the path which the infection is most likely to take and the probable point of localization. The types of organisms at the original site of the infection may give a clue to the drug most likely to be effective in medical treatment. Most important is the intimate knowledge of the fascial planes of the neck. Deep infections of the neck are far less common in medical practice today than they were ten to fifteen years ago. This, I believe, is due to more universal prophylaxis, the development of the sulfonamide drugs and the use of penicillin. The number has so appreciably decreased that I believe it is not fantastic to prophesy that in a short time deep infections of the neck will be rare.

Dr. Thomas E. Carmody, Denver: Many years ago Barnhill, Beck and I recommended that the field of otolaryngology be enlarged. I note that some of the speakers in the last year or two are recommending that. Dr. McCaskey has called attention to the mouth, which is something that was not mentioned a few years back. Many of the cases of Ludwig's angina (an-ji'nah)—I say that instead of McCaskey's angina (an'jin-ah)—originate in the mouth from an infection not only of dental abscesses but peridental abscesses and abscesses underneath the periosteum. Many of these abscesses are not found immediately, as Dr. McCaskey has said, but it requires eight or ten days before they will show up in the mouth even with roentgen examination, so that one needs to consider the delay in locating those besides the fact that the infection of the neck does not show up early. Osteomyelitis occurs frequently in these cases, and then it extends down into the floor of the mouth, either below the mylohyoid or above the mylohyoid, resulting in infection of the salivary glands, the peritonsillar spaces or the tonsillar spaces. There are also infections which travel downward. These not only affect the trachea but affect the post-tracheal fascia, and will extend into the mediastinum. Unless they are treated early, they will cause a great deal of trouble. Before the chemical drugs of today were available, roentgen radiation was frequently used to localize some of these infections, and it helped in many of them. Dr. McCaskey spoke of tracheotomy. Unless it is done early, it is of very little use. The abscesses should be opened and opened low enough. I have made the mistake of opening them high; the infection followed the muscle planes very low, and I had to open the abscesses lower down later on. Some patients were lost; some I was able to save.

Dr. Burt R. Shurly, Detroit: It gives me a great deal of pleasure to find that the general surgical problem is being treated more seriously by special workers in this field than it was in the past. This paper is timely and exceedingly fine. With this new era and with the current readjustment, individual and collective, this specialty is undergoing some of that change. The demand for an extension of our work to the borderline surgical fields is timely and necessary, and the members of the American Board are particularly interested in trying to help younger men to obtain a finer general surgical training. Particularly in recent time, the Board of General Surgery is cooperating in that questions on general surgical practice will be brought before those who come to examination. The interns and the residents, it is hoped will take perhaps an extra year of general surgical training. This subject of infections in the neck is one—it has been here always, and I feel that one should be qualified and competent to take on whatever may be necessary, surgically, medically or otherwise. In my earlier days one met with much bovine tuberculosis, in which the glands of the neck were involved, and surgical intervention was performed to remove those glands in a great many cases. Now, with the wonderful prevention of bovine tuberculosis and the marvelous health work, those glands infected by bovine tuberculosis have certainly diminished in a marvelous way. I feel keenly the tremendous value of sulfonamide drugs and penicillin. In the days of early diphtheria antitoxin, physicians were a bit tardy in giving sufficient dosage, and I consider that to be true now of a great many in the use of the sulfonamide drugs and penicillin. I have had a considerable number of patients with neck infections, tonsillitis, peritonsillitis and mastoids that have almost died. Over in Detroit and, I think, throughout the country at large, medical practice has been wonderfully influenced by what I think is the finest of the compounds, sulfadiazine and soda in large, sufficient and carefully watched dosage, and large doses of penicillin given intramuscularly promptly, early and plenty of them. This new era has come to the specialty with a tremendous value, which should be taken advantage of in the earliest stages of infection and followed through, never neglecting surgical intervention when the formation of pus makes that imperative.

Dr. Irving Wilson Voorhees, New York: My experience with these cases has been more limited than that of Dr. Shurly or Dr. Carmody. Over the past forty years I have seen 4 cases, all of them in private practice. All these cases followed dental extraction, except one, which was a deep infection following an unrecognized latent peritonsillar abscess on the right side. That patient had an early tracheotomy. Surgical intervention was performed following the tracheotomy, and the patient recovered in about three weeks. The important case was that of a gas bacillus infection in the left side of the neck following extraction of the lower teeth. This began about three days after the extraction, with a large hard swelling in the neck. Nothing was done until I saw the patient about five days after extraction. The dentist had sacrificed the tooth area, probably spreading the infection somewhat. The case was then turned over to a general surgeon, who made a small incision.

The whole area should be widely exposed, even if no pus is found, because the tension must be taken off the tissues and off the trachea so that tracheotomy may not become necessary. The timidity and the delay of some surgeons in not doing early tracheotomy needs to be emphasized. If one is going to do it at all, do it early. In this case all the tissues of the left side of the neck broke down. The muscles became a tarry, foul, stinking mass. They could be picked out by forceps. There was an opening from the mouth into the neck. The carotid was exposed and was seen pulsating. The gas bacillus was found in pure culture. The neck was irrigated every two hours with strong peroxide of hydrogen. I did not know then about penicillin or streptomycin or about introducing oxygen gas into the tissues. But I feel that in this particular case the oxygen "lavage" saved the man's life.

DR. B. M. KULLY, Los Angeles: As I listened to this excellent paper and the discussion, there was one point that came to my mind which I think should be emphasized. All use large doses of penicillin, but I think it should be remembered that penicillin may kill off the infection and not cause an absorption of the pus. There may be an abscess after the infection is gone. I should like to cite a case. A man came to me—he was a major in the Army—and gave a history of having been treated for a throat infection five months previously. I was able to contact his medical officer and found that he was given large doses of penicillin for a retropharyngeal cellulitis. He told me that his throat had never been right since and that he had some difficulty in swallowing. On examination he had a bulging of the posterior wall of his hypopharynx, low down just above his arytenoids. I aspirated it, got pure pus and a negative culture. It was incised and the man's symptoms were completely relieved. This was not a tuberculous abscess, because there was no involvement of the bone, and the man made an uneventful recovery. To me the case points to the fact that pus, even if all signs of infection have subsided, must be evacuated.

DR. CARL H. MCCASKEY, Indianapolis: The first argument that I have to make is with Dr. Carmody. He and I have had friendly discussions on the pronunciation of angina (an'jin-ah) or angina (an-ji'nah). We in Indiana like angina (an'jin-ah) and we call it angina (an'jin-ah). The usage of a word determines the pronunciation, isn't that right, Dr. Carmody? (Dr. Carmody nodded his head.) All right, we have that settled. Dr. Brown's case of nephritis was interesting and shows that one should not jump to a conclusion in making a diagnosis. After he had carefully examined the patient and found his condition to be due to a nephritis, it set up an entirely different picture as to treatment. Dr. Ashley's discussion relative to the general handling of these cases was quite pertinent. With regard to chemotherapy, it is generally known that organisms become fast to chemotherapeutic agents. That is cited in the last case. Perhaps this person had become fast to the chemotherapy that had been administered to him. This also holds good for a period of time after the administration of these agents. For instance, every one, including me, grabs at the chemotherapeutic agents for almost every type of infection that comes along, without any rhyme or reason. If one is treating infection of the neck or infection anywhere it is well to know the type of infection with which one is dealing and the type of chemotherapeutic agent which applies particularly to that organism. That is the reason I mentioned that one should, if unable to find the type of organism from smear or culture, at least be well acquainted with the type of organisms which inhabit the area. Therefore, one has some clue to the type of treatment to be followed. The chemotherapeutic agents will not absorb pus. One must drain it to get results, and that goes for the original site of infection. For instance, in an acute mastoid infection, if there is pus in the neck and in the mastoid, the mastoid abscess must be drained before relief will be obtained from drainage of the pus in the neck. I brought up this subject only for this particular reason: I hoped that a greater number of surgeons would become interested in some of these conditions of the neck. No one should attempt to do surgery of the neck who is not well prepared for it. He must know his anatomy, his pathology and his bacteriology.

THE PROBLEM OF GASTRIC CANCER

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A diagnosis of cancer of the stomach strikes fear into the hearts of patients. And well it might, when it is realized how relatively small the ultimate salvage of life is in patients whose disease is so diagnosed. One of the most favorable reports, that of Walters, Gray and Priestley [1] (1942) has suggested that only 6 per cent of their patients whose disease is diagnosed as gastric cancer are alive five years later. Weese [2] (1940) stated that of 883 patients admitted to the Tübingen Surgical Clinic between 1921 and 1932, only 8 per cent were alive five years later. Livingston and Pack [3] (1939) stated that definitive cures of unselected patients with gastric cancer is probably in the range of 2 per cent. In other words, it appears that 92 to 98 per cent of patients who have gastric cancer will die of the disease within five years. However, of patients who survive resection for gastric cancer for a period of five to seven years, Berkson [4] (1942) has expressed the belief that the subsequent life expectancy is about the same as for normal persons. The irony of the matter is that approximately only 25 per cent of patients who have gastric cancer are suitable candidates for a curative type of operation. In the Mayo Clinic series of those who survived resection (traced patients) 28.9 per cent survived five years and 20.4 per cent ten years. Of the resected cases in the Tübingen series, 19 per cent were alive five years later. Gastric cancer is curable, but the problem is to recognize the presence of the disease in time, so that the patient will not be denied the real hope that timely and well performed surgical intervention holds out to sufferers from gastric cancer.

Moreover, cancer of the stomach is the most frequent of all malignant growths. In regard to its incidence, Livingston and Pack [3] (1939) have written the following: "There are more deaths from cancer of the stomach than from all malignant tumors of lip, tongue, cheek, tonsil, pharynx, larynx, salivary glands, thyroid, male and female breast, ovary, uterine cervix and corpus uteri *combined*." Cramer [5] (1937) has stated that, from country to country (European), the incidence of cancer in a certain organ may vary considerably; yet the overall mortality of cancer for populations of various countries is approximately the same. The death rate for cancer of the stomach is high in almost all countries, and deaths from gastric cancer comprise from 25 to 40 per cent of all deaths from cancer.

Deaths from cancer in this country rank only next to cardiac disease as the most frequent cause of death. And of the 150,000 annual deaths from cancer in the United States, approximately 40,000 persons die of gastric cancer. Moreover, as the proportion of aging people in the population increases, it is obvious that

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1. Walters, W.; Gray, H., and Priestley, J.: Carcinoma and Other Malignant Lesions of the Stomach, Philadelphia, W. B. Saunders Company, 1942.

2. Weese, K.: Ergebnisse der Magenkrebsbehandlung bei 883 Fällen im Zeitabschnitt 1921-1932, Arch. f. klin. Chir. **198**: 202, 1940.

3. Livingston, E. M., and Pack, G. T.: End-Results in the Treatment of Gastric Cancer, New York, Paul B. Hoeber, Inc., 1939.

4. Berkson, J.: The Calculation of Survival Rates, in Walters, Gray and Priestley,[1] chap. 22.

5. Cramer, W.: The Importance of Statistical Investigations in the Campaign Against Cancer, Am. J. Cancer **29**: 1, 1937.

the total number of deaths from cancer as well as gastric cancer will increase. Truly, cancer and especially gastric cancer, the most frequent of all cancers, is a problem of public health of first importance.

ETIOLOGY

Experimental.—Fibiger's [6] (1913) conclusion that the eating by rats of cockroaches infested with Gongylonema neoplasticum was the cause of spontaneously occurring gastric cancers observed in those rats has been set aside by the demonstration that a similar papillomatosis of the preventriculus can be brought about in mice and rats by a vitamin A deficient diet.[7] Lorenz and Stewart [8] (1941) have observed the occurrence of an adenocarcinoma in the glandular portion of the stomachs of mice after the injection of 20-methylcholanthrene into the gastric wall. They have also obtained similar malignant tumors of both the stomach and intestine by the oral administration of 20-methylcholanthrene in light liquid petrolatum.[9] Strong,[10] (1945) employing hybridized mice, succeeded in perpetuating the carcinogenic influence of methylcholanthrene in subsequent generations of mice without continuing the administration of the carcinogen. Roffo [11] (1939) stated that he produced adenocarcinoma as well as sarcomas in rats fed fats or cholesterol heated to 300 C., a claim which is still awaiting confirmation. Peacock and Kirby [7b] (1944) have shown that, unlike benign gastropapillomatosis associated with dietary deficiency, papillomas induced with carcinogenic hydrocarbons (20-methylcholanthrene) are not prevented and fail to disappear with the addition of large amounts of vitamin A to the diet. An excellent review of the experimental aspects of gastric cancer was written by Peacock [12] of Glasgow, Scotland, in 1943. Excellent reviews have been published by Klein and Palmer [13] (1941) and Ivy [14] (1945).

Clinical.—On the clinical side, there is a wide diversity of opinion concerning the origins of gastric cancer. Most authorities agree that gastric cancer probably does not originate *de novo* from a normal gastric mucous membrane. There is no unanimity of opinion, however, concerning the importance of items which it is believed may give special encouragement to the development of gastric cancer; among these are to be enumerated: (1) the benign polyp, (2) atrophic gastritis and (3) gastric ulcer.

Ulcer.—Much debate has hedged about the problem of the extent to which a benign ulcer may favor the development of gastric cancer. Much of that discussion has generated more heat than light. However, there can be no doubt concerning the finality of the proof that cancer occasionally develops in a gastric ulcer. Every gastric surgeon of experience has seen large gastric ulcers which are found to be benign after excision. After a few years the patient may return with unmistakable evidence of cancer in the residual gastric fragment. A more detailed examination of the ulcer by the pathologist usually succeeds in finding the area which was carcinomatous in the initial specimen. Two such cases have been observed in this clinic within the past few years. These ulcer-cancers in which the malignant growth occupies only a small portion of an ulcer of long standing have been well described by pathologists. In addition, several patients have been seen in whom a gastrojejunostomy had been made previously elsewhere for benign gastric ulcer. With the lapse of years, gastric cancer may follow. This occurrence has been noted in patients in this clinic as long as eight and in 1 instance twenty-five years after the performance of the gastrojejunostomy.

No one doubts the thesis that an unhealed burn, a chronic sinus or an ulcer on the surface of the body may give rise to a cancer. There seems to be little reason to doubt that this same transition may occur in a gastric ulcer. Moreover, Magnus [15] (1937) has reported that a moderate to a severe degree of atrophic gastritis has been observed by him in every gastric ulcer specimen examined.

An even more cogent reason for looking on the gastric ulcer with suspicion is that the hazard of confusing benign and malignant ulcers is real. In other words, no reliable criteria are available to distinguish sharply and consistently by diagnostic means between benign and malignant gastric ulcer. For the stomach as a whole, it has been said that approximately 10 per cent of ulcers which are believed to be benign by conventional diagnostic measures are found to be cancerous when the ulcer is removed. Moreover in the immediate prepyloric area, the Boston group of observers have stated their belief that cancerous ulcers outnumber benign ulcers three to one.[16] Finsterer [17] (1938) has expressed the belief that if patients with ulcerocancer underwent operative intervention six months to a year earlier the cures would be about 90 per cent.

Since gastric resection for ulcer can be performed by the experienced surgeon at risks well below 5 per cent, there seems little justification for the physician to assume so conservative an attitude toward the chronic gastric ulcer that the patient's future may be compromised thereby. This is one of many factors which contribute to delay in bringing the patient with gastric cancer for early operation.

Atrophic Gastritis.—Konjetzny [18] has been the keenest proponent of atrophic gastritis as a frequent precursor of gastric cancer. Schindler [19] has also favored this view. This idea gets its strongest support from the frequency with which pernicious anemia is complicated by gastric cancer. That atrophic gastritis is a regular accompaniment of pernicious anemia has long been

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7. (*a*) Passey, F. W.; Lees, A., and Knox, J. C.: Spiroptera Cancer and Diet Deficiency, J. Path. & Bact. **40**: 198, 1935. (*b*) Peacock, P. R., and Kirby A. H. M.: Attempts to Induce Stomach Tumors: II. The Action of Carcinogenic Hydrocarbons on Stock Mice, Cancer Research **4**: 88, 1944.

8. Lorenz, E., and Stewart, H. L.: Intestinal Carcinoma and Other Lesions of the Forestomach in Mice Following Oral Administration of Twenty-Methylcholanthrene and 1,2,5,6 Dibenzanthracene, J. Nat. Cancer Inst. **1**: 273, 1940.

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10. Strong, L. C.: Genetic Analysis of the Induction of Tumors by Methylcholanthrene, OX: Induced and Spontaneous Adenocarcinomas of the Stomach in Mice, J. Nat. Cancer Inst. **5**: 339, 1945.

11. Roffo, A. H.: Krebserzeugende Wirkung des aus dem cholesterin gewonnenen phenanthrenderivates, Ztschr. f. Krebsforsch. **49**: 341, 1939.

12. Peacock, P. R.: Gastric Cancer: An Experimental Approach to the Problem of Causation, Glasgow M. J. **139**: 117, 1943.

13. Klein, A. J., and Palmer, W. L.: Experimental Gastric Carcinoma: A Critical Review with Comments on the Criteria of Induced Malignancy, J. Nat. Cancer Inst. **1**: 559, 1941.

14. Ivy, A. C.: Gastric Physiology in Relation to Gastric Cancer, J. Nat. Cancer Inst. **5**: 313, 1945.

15. Magnus, H. A.: Investigation of the Pathology of Gastritis with Special Reference to a Precancerous Condition of the Gastric Mucosa, St. Barth. Hosp. Rep. **70**: 314, 1937.

16. Sampson, D. A., and Sosman, M. C.: Prepyloric Ulcer and Carcinoma, Am. J. Roentgenol. **42**: 797, 1939.

17. Finsterer, H.: Ueber das gleichzeitige Vorkommen von Ulkus und Karzinom im Magen, Wien. med. Wchnschr. **88**: 13, 1938.

18. (*a*) Konjetzny, G. E.: Der Magenkrebs, Stuttgart, F. Enke, 1938; (*b*) Der Oberflachliche Schleimhautkrebs des Magens, Chirurg **12**: 192, 1940.

19. Schindler, R.: Early Diagnosis of Cancer of the Stomach: Gastroscopy and Gastric Biopsies, Gastro-Photography and X-Rays, J. Nat. Cancer Inst. **1**: 451, 1941.

known. Magnus and Ungley [20] (1938) pointed out that the atrophy is not patchy in pernicious anemia as in most idiopathic achlorhydrias but is diffuse and moreover involves all the layers of the gastric wall, especially the corpus and fundus, resulting in a parchment-like thinness of the stomach. Kaplan and Rigler [21] (1945) have stated that the incidence of gastric cancer in patients dying of pernicious anemia is 12.3 per cent, or three times the expected autopsy incidence of gastric cancer in patients belonging to the same age group. Rhoads [22] (1941) previously had summarized the clinical and pathologic evidence relative to the relation of pernicious anemia to gastric cancer. His observations are in general accord with those of Kaplan and Rigler. Moreover, gastric polyps are of frequent occurrence in the atrophic gastric mucous membrane of patients with pernicious anemia. Madelaine Brown [23] (1934) pointed out this unexpected association in an autopsy survey of patients who had died of pernicious anemia, an observation which Kaplan and Rigler later confirmed.

Rodgers and Jones [24] (1938) noted the presence of superficial hemorrhagic erosions and ulcers on gastroscopic examination of patients with atrophic gastritis and idiopathic achlorhydria. This is an important finding, and one which justifies continued observation to determine the fate of such erosions.

Polyps.—Most authors who have studied precursors of gastric cancer have incriminated the polyp, including Borrmann [25] (1926), Konjetzny [18a] (1938), Schindler [19] (1941) and Westhues [26] (1942). Tracy Mallory [27] (1940) has described the presence of noninvasive carcinoma in situ in gastric polyps and has stated that "their pronounced tendency toward malignant degeneration" is generally admitted. Kaplan and Rigler [21] wrote concerning the gastric polyp found in patients having pernicious anemia that: "the demonstration of gastric polyps in association with pernicious anemia has almost the same significance as the demonstration of carcinoma *per se*." Westhues [26] (1942) expressed the belief that most gastric polyps are essentially tumors and are not the result of inflammatory gastritis, as is suggested in the work of Konjetzny. Spriggs and Marxer [28] (1943), however, dissented from this view and have followed a number of patients with gastric polyps over a period of years without observing evidences of cancer.

In this clinic a study has been made of patients past 50 years of age who are achlorhydric to histamine, and a fairly large number of such polyps have been discovered. At present 15 are under observation. At one time the majority opinion in this matter was followed and the gastric polyp was regarded as a likely precursor of gastric cancer, which, with the passage of sufficient time, it well may be. After the performance of gastric resection for a fairly large number of such patients, there has finally been a reversion to the policy of following them three or four times a year by gastroscopic and roentgen examinations. At present there are 2 such patients under observation, who have both pernicious anemia and gastric polyps.

The description of Borrmann [25] (1926), Mallory [27] (1940) and others of heteropia of the gastric mucous membrane in such polyps together with histologic evidence of noninvasive cancer suggests obviously the need for caution in pursuing a conservative policy. Moreover, in 1 instance a patient who underwent gastric resection for benign polyp in 1941 returned with gastric bleeding three years later but at that time refused to permit reoperation. When pain again recurred the patient acceded to operative intervention (1945), but an irremovable cancer, which had spread beyond the confines of the residual gastric pouch, was found.

Unfortunately, biopsy cannot readily be performed through a gastroscope. It may well be that occasional removal of such allegedly benign gastric polyps through a small abdominal incision will be warranted in the light of the great practical importance of the considerations involved.

EXTRINSIC FACTORS

There is a sharp difference of opinion among persons interested and experienced in the problem of gastric cancer in regard to the role of extrinsic factors in the origin of gastric cancer in man. There are those who believe that the so-called constitutional susceptibility is important. Others would indict in such an analysis exogenous factors, particularly diet. Nettleship [29] (1943) has discussed this problem in an interesting and informative manner and has listed such factors as diet, age, heredity, heat, alcohol, bacteria, viruses, allergy and infections.

The influence of temperature of ingested liquids and food and the irritant quality of liqueurs, alcohol, spices and rough foods on the esophageal or gastric mucous membranes must perforce be considered. When, however, one reaches the lower alimentary tract, especially the rectum and colon, all such influences have been dissipated. Then, apart from so-called constitutional predisposition, the important question arises of carcinogens in the intestinal content itself.

Age is, of course, an important determinant in all forms of cancer. Herring [30] (1936) has pointed out that states with the largest percentage of their population above 45 years of age have the largest mortality due to cancer. New Hampshire, with 30.3 per cent of its people above 45, has an annual cancer mortality rate of 155.4 per 100,000, the highest in the United States.

Dr. David State of this clinic has undertaken the task of interrogating the relatives of patients with gastric cancer to determine the frequency of cancer in their families. In the families of 200 patients with gastric cancer, a history of cancer was obtained in 31.6 per cent; in half of these instances (15.6 per cent) a history of gastric cancer was elicited. Dr. State interrogated the relatives of 200 patients with gallbladder disease (nonmalignant), of 200 with cancer of the colon and rectum and of 200 patients seeking treatment because

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27. Mallory, T. B.: Carcinoma in Situ of the Stomach and Its Bearing on the Histogenesis ot Malignant Ulcers, Arch. Path. **30**: 348 (July) 1940.
28. Spriggs, E., and Marxer, O.: Polyp of Stomach and Polypoid Gastritis, Quart. J. Med. **12**: 1, 1943.
29. Nettleship, A.: Experimental Gastric Carcinoma. Arch. Surg. **46**: 793 (June) 1943.
30. Herring, R. A.: Cancer in the District of Columbia, New York, American Society for the Control of Cancer, 1936.

of hemorrhoids. Interestingly enough, the overall incidence of cancer in the family was much the same: for gallbladder disease 26 per cent; for cancer of the colon and rectum 30.7 per cent, and for hemorrhoids 29.6 per cent. The only conclusion which one legitimately may draw from these observations is that cancer is frequent and approximately 30 per cent of families give a history of cancer sufferers amongst their members.

THE PROBLEM OF GASTRIC CANCER

These facts afford evidence of the great importance of the problem presented by gastric cancer. This perplexing problem obviously comprises many factors, most of which have had considerable discussion. Several well-known surgeons, who in the estimation of their colleagues were authorities on the clinical aspects of the disease and who essayed to instruct others in the early manifestations of gastric cancer, recognized the signs of the disease in themselves too late to benefit by that therapeutic agent of which they themselves were masters. Among others are to be enumerated the names of Johannes von Mikulicz, W. J. Mayo, D. P. D. Wilkie and Martin Kirschner. The late R. D. Carman, well-known roentgenologist who contributed a useful sign to the roentgenologic diagnosis of gastric cancer, had a gastric cancer which was inoperable before he recognized the signs of the disease in himself.

This circumstance in itself suggests that there is no symptom complex by which the disease can be identified, a situation which a number of other particulars and occurrences corroborate. The absence of warning signs of approaching danger accounts in large measure for the circumstance that so many patients with gastric cancer are inoperable when they first consult their physician. The German poet Theodor Storm, who wrote "Immensee," which a number of us studied in earlier years, died of gastric cancer. He wrote a poem entitled "Beginn des Endes" [31] concerning his illness, which described well the insidiousness of gastric cancer.

Beginning of the End

'Tis but a prick, 'tis scarce a pain,
Just felt, to which no name you give:
Henceforth it speaks again-again,
Uneasy now you have to live.

If to complain you try—of what?
You cannot put it into speech:
Within you say, "Indeed 'tis naught!"
Henceforth it holds fast like a leech.

So seldom strange your world does grow,
And quickly are you stript of hope,
Until at last you really know
That with Death's shaft you cannot cope.

Storm died in 1888, seven years after Billroth had the first operative success with gastric cancer. The roentgen ray, discovered in 1895, has since become the most reliable means of diagnosing gastric cancer. While this agent even in expert hands is not infallible, it approaches a state of excellence achieved by only a few diagnostic agents. The problem is to get those afflicted with gastric cancer in the early stages to consult expert roentgenologists in time, so that surgical intervention will benefit a larger number of patients with gastric cancer.

It seems strange indeed that a malignant tumor can attain inoperable proportions in so active and useful an organ as the stomach without revealing early signs of its presence. I myself have removed from a young girl's stomach a hairball which produced a tumefaction on the abdominal wall, which outlined the stomach precisely. Yet after the bezoar was removed, the patient insisted that the sense of satiety after eating was acquired just as quickly as when that large hairball filled the gastric lumen! In other words, it is strange to what extent this organ, which can manifest signs of functional derangement readily in the presence of emotional or physiologic disturbances which have their origin elsewhere in the body, can accommodate itself to extensive local encroachment on its functions without revealing a trace of disorder.

This ability is peculiar to all hollow viscera; and inasmuch as the gastric lumen is so large, it is understandable that early detection by functional derangement in corporic or fundic gastric lesions is unusual, save as indicated by hemorrhage. It takes approximately 70 cc. of blood to produce a stool in which the presence of blood may be detected grossly. Two to 4 cc. of blood suffice usually to give a positive guaiac test in the stool.

How, then, is one to suspect the presence of a gastric cancer? Obviously one's primary concern is not the heedlessness and indifference of patients to their symptoms, though this item as well as the reaction of physicians to the complaints of patients is not without importance for the problem—one's primary concern, if one is to be realistic, must be with the circumstance that a gastric cancer may become inoperable before its presence causes any perceptible derangement of function.

Cutaneous cancers occur largely beyond the wrist line and above the collar line. Moreover, they grow slowly. The significance of a small blemish of the skin which fails to heal may not be appreciated immediately, but its very presence urges its owner or his friends or relatives to have something done about it. Even in cancers which are accessible to the examiner's hand but hidden from the sight of others early detection is by no means regular, and the frequency with which those who suffer from cancer of the tongue, breast, uterus and especially its cervix, vulva, penis, prostate and rectum come late for treatment is a matter of general knowledge.

To permit the recognition of a cancer, an area of induration, tumefaction or ulceration must be present. And how long have cancer cells been present to permit such an occurrence? Undoubtedly, the time interval is variable and is dependent largely on the rapidity of growth. In patients for whom I have performed what I regarded as a radical operation for cancer of the stomach only to learn subsequently that cancer cells were detected by the pathologist in the most proximal line of resection, it has been my observation that these patients usually remain asymptomatic for eighteen to twenty-four months. This interval of freedom from symptoms in such palliative gastric resections gives some indication of how long it takes a cancerous tumor which already has exhibited invasive qualities to grow and reassert itself.

The greatest hurdle to early detection of internal cancer is the absence of a reliable immunologic test for cancer. Such a diagnostic agency is the hope of every clinician who must wrestle with the intricate complexities of the recognition of cancer. And whereas such specific tests for cancer are well within the realm of achievement, there is little promise that such serologic tests will be available soon.

31. Kindly translated for me by Miss Elizabeth Nissen, assistant professor of romance languages, University of Minnesota.

FREQUENCY OF GASTRIC CANCER

The death rate from cancer of the stomach in the United States is approximately 30 per 100,000 for the population as a whole. At the peak incidence of occurrence, which is between 400 and 500 for men between 75 and 80 years of age, only 1 man among every 200 to 250 will die each year of gastric cancer. There seems to be a fairly sharp rise in mortality due to gastric cancer in men at 55 and in women at 65 years of age. According to Kirschner [32] (1940) more than half the deaths from cancer among men in Germany are due to gastric cancer. And the studies of Dormanns [33] (1939) suggest that approximately 33 per cent of all cancer deaths in Germany are due to gastric cancer.

Both vital statistics and necropsy statistics are mortality records. They deal with the frequency of cancers among the dead, not the living. There is a certain concordance between the causes of death in these mortality records. In the main, autopsy records are perhaps weighted with more than a representative number of serious illnesses which demand hospitalization, to which category of disease cancer belongs. Yet the greater accuracy of diagnosis at autopsy offsets in large measure the disparity of uneven distribution of disease present in autopsy statistics.

Frequency of Cancer in Autopsy Records

	No. of Autopsies	Percentage of All Deaths Due to Cancer		Percentage of Cancer Deaths Due to Gastric Cancer	
		Males	Females	Males	Females
Berman [34] (1944) (Minnesota 1933-1938) all ages	11,543	17.0	19.0	...	...
Dormanns [35] (1937) (1925-1933) 42 German institutions; all males over 20 years	124,827	17.7	....	6.0	...
Lummerich [36] (1936) (1925-1934) Hamburg, Germany; men and women over 20 years	10,566	17.4	20.7	6.7 8.8 (50-70)	4.3 5.0 (40-70)

Berman [34] (1940) examined the autopsy records of the Department of Pathology of the University of Minnesota between 1933 and 1938, during which years 11,543 autopsies were performed. Berman found that 19 per cent of the deaths in females over 1 year of age was owing to cancer and that for males this figure was 17 per cent.

Dormanns [35] (1937) analyzed the causes of death in 124,827 autopsies performed on men over 20 years of age in forty-two pathologic institutes in Germany between 1925 and 1933. Of these deaths 22,139, or 17.7 per cent, were due to cancer; 33 per cent of all cancer deaths were caused by gastric cancer. Dormanns, however, included only carcinomas and excluded lymphoblastomas, brain tumors and sarcomas, which together constitute a rather large group. In Dormanns' series 6 per cent of all cancer deaths were due to gastric cancer.

Lummerich [36] (1936) examined the autopsy records of the Barmbeck Krankenhaus in Hamburg for the years 1925 to 1934. There were 10,566 autopsies done on men and women over 20 years of age, of which number 19.1 per cent died of cancer. The cancer mortality for women over 20 was 20.7 per cent; for men, 17.4 per cent. In Lummerich's series 6.7 per cent of all deaths in men over 20 years of age were from gastric cancer; in women this figure was 4.3 per cent. In women between the ages of 40 and 70 gastric cancer was responsible for 5 per cent of the deaths, and in men between 50 and 70, 8.8 per cent of all deaths were caused by gastric cancer. In other words, among women between 40 and 70 years 1 in 20 deaths was due to gastric cancer and among men, 1 in 12. (See the accompanying table.)

AN ATTEMPT TO FIND PRECURSORS OF GASTRIC CANCER

Together with colleagues in the Departments of Medicine, Pathology and Radiology, my associates and I began in July 1945 to scrutinize carefully all patients with demonstrated histamine achlorhydria (no free hydrochloric acid after three successive 0.5 mg. doses of histamine given at intervals of thirty minutes) in men over 55 and in women over 65. Since Jan. 1, 1946 men and women past 50 years of age have been accepted for study. All such patients found to be achlorhydric, whether men or women, have been subjected to careful roentgen studies and whenever feasible to gastroscopic examination. During this interval there was a registration in the outpatient clinic of the University Hospitals of 1,949 eligible persons (from the point of view of age). Of this number, 1,070 patients (649 men and 421 women) were submitted to fractional gastric analysis with histamine. Only 205 patients were found refractory to all three doses of histamine; 62 additional patients remained achlorhydric after two doses and 34 to a simple injection of histamine. In all there were 301 achlorhydric patients available for study. To this group of cases an earlier series of 85 additional cases studied by Dr. Macnider Wetherby of the Department of Medicine was available for continued study. In addition, 79 patients with known pernicious anemia were also available to us.

Among these 464 patients who were achlorhydric to histamine, 15 patients with polyps have been found—the most fruitful observations of the study. In a large percentage of the patients coming to this clinic with carcinoma of the stomach, the disease has already been diagnosed before their arrival, or the presence of such a lesion is suspected by the first observers to see the patient in the outpatient clinic. In consequence, during the fifteen month period that this study has been under way, only 3 undetected gastric carcinomas have been uncovered. Only 1 of these was early. Moreover, this patient's lesion was missed by roentgen examination; he also had a cecal cancer, and when operative intervention was undertaken by the resident, Dr. Arnold Kremen, the gastric lesion was found. Both lesions were dealt with successfully at the same operation. A similar occurrence happened with a rectosigmoidal cancer in a patient in whom no search for a gastric cancer had been made preoperatively. This patient, aged 75, had extensions of the lesion into a loop of terminal ileum. A fairly large gastric cancer was a surprise finding. Three simultaneous resections were carried out successfully for the patient. The third patient, and the only isolated instance in this group of patients in which the detection of a gastric cancer was due solely

32. Kirschner, M.: Zur Bekämpfung der Krebskrankheit, Chirurg **12**: 177, 1940.
33. Dormanns, E.: Das Oesophaguscarcinom: Ergebnisse der unter Mitarbeit von nein und dreizig pathologischen Instituten Deutschlands durchgeführten Erhebung über das Oesophaguscarcinom (1925-33), Ztschr. f. Krebsforsch. **49**: 86, 1939.
34. Berman, L.: Cancer as a Cause of Death in the University of Minnesota Necropsy Collection, Thesis, University of Minnesota, June 1940.
35. Dormanns, E.: Die vergleichende geographisch-pathologische Reichs-Carcinomstatistik 1925-1933, Ztschr. f. Krebsforsch. **45**: 471, 1937.
36. Lummerich, F.: Statistik der Carcinomtodesfälle nach Sektionsmaterial 1925-1934 des Allg. Krankenhauses Barmbeck in Hamburg, Ztschr. f. Krebsforsch. **44**: 476, 1936.

to study suggested by the presence of achlorhydria, was a large man of 73 with hypertension, who succumbed after operation from hemiplegia. The tumor was large, and the operation, undertaken by Dr. David State, was essentially a palliative resection.

This is not the record of an accomplishment which justifies enthusiasm. The greatest promise of the study so far appears to be the continued observation of the patients found to have polyps and the search for gastric polyps in other achlorhydric patients. It is an interesting observation that patients with gastric polyps are almost uniformly achlorhydric, a circumstance to which Brunn and Pearl [37] (1938) have directed attention.

Among the 140 patients with gastric cancer, whose records have been reviewed in this study by Drs. Robert A. Hebbel and David Gaviser, only patients with polypoid cancer were uniformly achlorhydric. The incidence of achlorhydria in ulcerative and diffuse cancer (Borrmann's classification) varied between 55 and 67 per cent. The polypoid variety, the type of gastric cancer with the most favorable prognosis, is unfortunately uncommon, being observed only 5 times among the 140 patients.

St. John, Swenson and Harvey [38] (1944) subjected 2,413 patients over 50 years of age to a brief fluoroscopic survey of the stomach. In this group of patients, 2 silent gastric cancers and 1 lymphosarcoma were found, an incidence of unsuspected gastric malignancy of 1.24 per 1,000 patients. No gastric polyps were observed in this study. Dailey and Miller [39] (1945) reported a series of 500 patients subjected to barium examination of the stomach. These examinations were performed on presumably normal men who were free from digestive complaints and were over the age of 45. Three gastric lesions were found: a benign gastric ulcer, a polyp and antral gastritis.

DISPOSITION OF PATIENTS IN WHOM DIAGNOSIS OF GASTRIC CANCER IS MADE

In the light of present knowledge, the only worth while treatment for patients with gastric cancer is surgical extirpation. The most radical surgery with the lowest mortality is the best surgery. William J. Mayo, a keen exponent of gastric surgery, gave the surgery of gastric cancer in this country an early impetus, which practice should have had wider emulation in other clinics. The accomplishments of surgery in gastric cancer during the past decade have been real. The lament of surgeons is that so many patients come late. The fundamental clinical problem in gastric cancer is not improvement in gastric surgical procedure, though considerable opportunity for improvement exists there, too. The problem which demands solution in the management of gastric cancer is earlier recognition.

Surgeons schooled and experienced in the disciplines of visceral surgery can resect the stomach for cancer with risks which are not far in excess of those assumed by patients undergoing resection for benign ulcer. Obviously, the number of patients who are advanced in age and in poor physical condition together with the more aggressive character of the surgical removal with reference to lymph nodes and adjacent structures does increase the risk. It was not so long ago that the operative mortality from total gastrectomy was approximately 50 per cent. However, surgeons have learned to deal more effectively with the technical details of suturing the esophagus to the jejunum and have reduced that risk considerably. A technic which I have used to advantage is to suture the mesenteric border of the jejunum behind the esophagus. This maneuver permits the placement of two rows of interrupted silk sutures which anchor the posterior wall of the esophagus firmly against the wall of the jejunal segment. The anastomosis then may be made at the antemesenteric border. Employment of the anterior peritoneal flap overlying the subdiaphragmatic esophagus as described by Lahey [40] (1928), Kirschner [41] (1933) and Jones [42] (1945) is utilized to cover the suture line anteriorly.

In this clinic the closed anastomosis has been employed routinely in all resections of the gastrointestinal canal since 1938. It affords the greatest opportunity for performing the operation in an aseptic manner. All these items have been described previously [43] and will not be repeated here.

The importance of excision of the greater omentum has been stressed particularly by Groves [44] (1910) and Finsterer [45] (1930). An equally important item is complete excision of the gastrohepatic omentum above the lesser curvature. By trimming the avascular and normally somewhat diaphanous membrane down from the hepatic edge and isolating and tying the left gastric artery just after it leaves the celiac axis, the entire lymph-node-bearing area of the lesser curvature can be removed. Near the esophageal juncture this procedure is carried out most readily in a retrograde fashion. By separating the leaves of the gastrohepatic omentum near the site at which the left gastric artery meets the lesser curvature, the upper attachments of the gastrohepatic omentum can readily be removed up to and including that portion attached to the esophagus. After the gastric wall is bared between the leaves of the gastrohepatic omentum where the branches of the left gastric artery enter it, a long curved hemostat or dissector can be run up this groove. A counter opening is made just over the subdiaphragmatic esophagus, and the remnants of the gastrohepatic omentum are easily removed from the gastric wall. This maneuver removes the entire blood supply of the lesser curvature, leaving the residual gastric fragment dependent on the small gastric arteries which come from the splenic or the left gastroepiploic artery.

Direct extension of the cancer into adjacent organs such as the pancreas, the left lobe of the liver and the transverse colon necessitates consideration of removal of the segments of tissue involved—extensions of the operation for gastric cancer which are fully justified in otherwise suitable cases. Moreover, lymphatic extensions into the transverse mesocolon are seen now and then, a circumstance which may suggest that the excision of the entire transverse mesocolon together with the spleen is the wisest procedure. For extensions in

37. Brunn, H., and Pearl, F.: Multiple Gastric Polyposis, Am. J. Surg. **40**: 51, 1938.
38. St. John, F. B.; Swenson, P. C., and Harvey, H. D.: Experiment in Early Diagnosis of Gastric Carcinoma, Ann. Surg. **119**: 225, 1944.
39. Dailey, M. E., and Miller, E. R.: Research for Symptomless Gastric Cancer in Five Hundred Apparently Healthy Men 45 and Over, Gastroenterology **5**: 1, 1945.
40. Lahey, F. H.: Complete Removal of the Stomach for Malignancy with the Report of Five Surgically Successful Cases, Surg. Gynec. & Obst. **67**: 212, 1928.
41. Kirschner, M.: Operative Surgery: The Abdomen and Rectum, translated by I. S. Ravdin, Philadelphia, J. B. Lippincott Company, 1933, vol. 1, p. 179.
42. Jones, T. E., and Kehm, R. W.: Total Gastrectomy: Report of Eight Cases, Surg., Gynec. & Obst. **80**: 534, 1945.
43. Wangensteen, O. H.: The Surgical Problem of Gastric Cancer, with Special Reference to Closed Method of Gastric Resection, Coincidental Hepatic Resection and Preoperative and Postoperative Management, Arch. Surg. **46**: 879 (June) 1943.
44. Groves, R.: Radical Operation for Cancer of the Pylorus, with Special Reference to the Advantages of the Two-Stage Operation and to the Question of the Removal of the Associated Lymphatics, abstracted, Brit. M. J. **1**: 366, 1910.
45. Finsterer, H.: Zur Klinik und chirurgischen Behandlung des Magenkrebses, Arch. f. klin. Chir. **159**: 230, 1930.

the head of the pancreas, unfortunately this principle of operative procedure would frequently demand performance of the Whipple operation, a rather formidable enlargement of the operation for gastric cancer.

One of the extensions of gastric cancer which is most difficult to deal with is the excision of adherent lymph nodes in juxtaposition to the common biliary duct, hepatic artery and portal vein. By removing the peritoneum overlying these structures and by isolating and dividing the gastroduodenal artery, the hepatic artery may be displaced upward and to the left, permitting at least partial separation of these structures and removal of involved lymph nodes.

Palliative gastric resection in the presence of hepatic metastases is fully justified. The palliation achieved thereby averages in our experience about fifteen months. For hepatic metastases from primary rectal or colic cancers, however, removal of the local lesion has resulted in extending the life of a few patients two or three years and longer. This circumstance suggested the possibility of excising the hepatic metastases in patients undergoing colic resection for cancer, an operative procedure which now has been carried out in several patients. The problem of hemostasis in resection of the liver is not difficult, and, knowing the great capacity of the liver to regenerate, the feasibility of extensive hepatic resections as well as reoperation for the removal of additional previously undetected hepatic metastases is within the range of possibility.

Whereas surgeons can perform these operations, mere discussion of the magnitude of the undertaking suggests definitely that a greater salvage of life from gastric cancer is to be obtained by having the patients submit to operative intervention before it is necessary that the resection be so radical.

The experience of this clinic suggests that these radical operations for gastric cancer, including total gastrectomy, can be performed at a reasonable risk. For the past four years, during which time 160 resections (including total gastrectomies) were performed, the hospital mortality was 8.1 per cent. In 1945 there were 62 resections (including 9 total gastrectomies) with 3 deaths (4.8 per cent mortality).

The resection rate of patients operated on for gastric cancer in this clinic has been approximately 90 per cent for several years. In other words, palliative resections are being undertaken in a number of instances. In consequence, the per cent of long survivors after operative intervention will probably not be as great as that in clinics where resection is confined largely to cases with a favorable outlook. My colleague, Dr. David State, is compiling the late results in patients operated on for gastric cancer in the last ten years. The follow-up, though not complete, suggests definitely that a radical operative procedure holds out real promise to those who have gastric cancer.

Heretofore, many surgeons have performed a 95 per cent resection in many patients in whom total gastrectomy would have been a better operation for cancer—and solely because the subtotal operation is a safer procedure. With improvement of the mortality score of total gastrectomy, and with more consistent performance of a complete operation for gastric cancer which deals satisfactorily with the problems of the lymph nodes and local extension, the number of long survivors after operation will increase considerably. The development of a technic of esophageal resection holds out hope for those patients whose lesions involve both the fundus of the stomach and the distal end of the esophagus, a neoplasm which up until a few years ago was regarded as inoperable. The surgical management of these lesions is primarily a problem of the esophagus and has not been dealt with in this article.

THE NEED FOR REAWAKENING INTEREST IN THE EARLIER DIAGNOSIS OF CANCER

The proportions to which a gastric cancer may grow without causing symptoms have already been indicated. Moreover, patients with cancers which affect organs within reach of the examiner's hand as a group also seek treatment late. There is undoubtedly a time when every maligant tumor is a local lesion. In approximately 25 per cent of patients with gastric cancer coming to autopsy, the disease involves only the stomach and the adjacent lymph nodes. In any cancer involvement of the lymph nodes influences the prognosis in a distinctly unfavorable manner. The lapse of time from the assumption of histologic characteristics of cancer by mucosal or epithelial cells to the invasion of the normal submucosal or subepithelial tissue is undoubtedly a variable phenomenon. In the main, gastric cancers are of a high grade of malignancy and probably demonstrate invasive features early. However, even for gastric cancer Mallory [27] (1940) has shown that such tumors may remain as carcinomas in situ for rather long intervals of time.

The interest of the public in cancer is real. Many persons, perhaps some physicians among them, believe that a Cancer Commission with authority to draft competent workers with research experience—such a group to pool their knowledge and talents—could with adequate funds untie the gordian knot of the problem of cancer in a period of five to ten years. Without question such a planned and coordinated attack on the problem of cancer would bring to light many new facts. The process of accumulating new facts is slow. The construction of an idea or an approach to a problem by experienced persons in possession of the assembled facts progresses directly with the availability of known facts. If they are few, the process will be as slow as constructing a house from bricks when only an occasional brick becomes available at periodic intervals.

Such appears to be the situation in the experimental approach to the problem of cancer. Distinct progress is being made from year to year. Until the stock of available information is greater, it cannot be expected that a preventive agent against cancer or a revolutionary therapeutic agent to combat established cancer will be found quickly.

The public looks to the members of the medical profession for intelligent guidance in matters of health. The public is willing to spend unlimited funds to conquer the scourge of cancer. The important contributions of scientists to the winning of the war has the public wondering whether use of the same tactics would not soon end the tyranny of cancer. Certainly cancer research should continue with unremitting vigor. But until many more facts concerning cancer are known it is unreasonable to expect that the experimental approach to the problem will quickly turn up a cure for cancer.

However, it is known that 1 woman of every 5 past 40 years of age is destined to die of cancer and that 1 of 6 men past 50 similarly will die of cancer. This is not a pleasant prospect, especially when one realizes that for a large number of cancers, especially those of the digestive tract, which constitute more than 50 per cent of all fatal cancers, the problem is primarily

one of recognition and not of cure. In other words, granted early diagnosis, a large number of cancers are curable.

It is known that a large per cent of persons will have cancer and die of it. The only unknowns are: (1) which persons, (2) in what organ and (3) when?

Let us consider the case of the mouse. The average life span of the mouse is approximately sixteen months or four hundred and eighty days. In cancerous strains of laboratory mice in which cancer of the breast develops, tumors begin to make their appearance ten to twelve months after birth, or when about 60 to 75 per cent of the life span of the mouse has been lived.

Approximately 90 per cent of fatal cancers are observed in persons over 40 years of age. In the female there is a definite increase in the mortality due to cancer at 40 years of age. The life expectancy of persons who have already reached the age of 50 is approximately twenty years. In women when approximately 60 per cent of the life span has been spent and in men when 70 per cent of the allotted time has run out cancer is most likely to make its appearance. Workers in cancer who deal with mice examine the mice once a week for evidence of tumors. Should not physicians observe the same care in examining men and women for evidences of cancer as experimental workers do in caring for mice?

Cancers in situ perhaps will not often be recognized in the stomach. Yet periodic examination of all men and women who have reached "the cancer years" undoubtedly will make an important contribution to earlier recognition of cancer.

Will the public which is so keenly interested in a cure for cancer be cooperative in this effort? There is need for Cancer Detection Clinics set up at strategic places with competent specialists in the various branches of medicine and surgery. Moreover, there is need for the cooperation of all men and women in attending such clinics, when established, approximately three times a year. If the support in funds and of the public in attendance on such clinics is forthcoming, I believe that it will represent the best use of the available knowledge in dealing with the problem of cancer. The promise of the future is in the discovery of new facts which will lead to new ideas and a final solution of the problem of cancer. One must plan for one's own generation, however, and for one's children and grandchildren, as well as for generations yet unborn. To that end, one must be realistic and deal with situations as they are and not with situations as one would have them.

The worth of the Cancer Detection Clinic remains to be proved. But granted adequate financial support and backing by the members of the medical profession and cooperation by the public, I believe that the establishment of such a clinic will be an important step toward bringing the menace of cancer under control. Until this venture has proved itself in a factual manner, the unlimited support of the undertaking by any agency cannot be expected. Given an adequate opportunity, however, I am convinced that a few "pilot plants" will not only be able to explore the province of Cancer Detection Clinics but also to prove their worth.

It may seem somewhat anomalous that a surgeon, from whom expressions might be expected concerning the benefits of his specialty to patients with gastric cancer should belabor the item of diagnosis. In contemplating the achievement of surgery in wrestling with the problem of gastric cancer—and I am certain that many share this impression—I feel that it is much as though one has been at work enthusiastically and feverishly in the back yard at a huge woodpile. When one glances up to survey what remains to be done, startled by the small proof of his efforts and at the same time noting that the sun is well past the meridian, one realizes the futility of merely whittling away at a constantly enlarging woodpile. Moreover, the better wood is at the fresher end of the pile. I would not depreciate the accomplishment of the surgeon; on the contrary, if in every phase of activity relative to gastric cancer there had been an improvement similar to that which has occurred in its surgical management, the surgeon would have far less occasion for dissatisfaction with his accomplishment.

If one reviews the progress that has been made with the problem of gastric cancer since the International Conference on Cancer was held in London in 1928, the conclusion is inescapable that the contribution of surgeons in extending the benefactions of surgery to an ever increasing number of patients constitutes the most important advance during this period, however small that gain appears to be when measured against the broad background of the entire problem of gastric cancer. Yet the distinguished Scottish surgeon, Wilkie,[46] who spoke at that conference on "Early Diagnosis and Treatment of Gastric Cancer" and who has since died of a gastric cancer diagnosed too late, said on that occasion, "The technique of the operation (for gastric cancer) has been raised to a standard which leaves little to be desired." If during the next eighteen years as important progress can be made in the early detection and recognition of gastric cancer as has been made since these words of Wilkie's were spoken, considerable acceleration of momentum will have been lent to the solution of the problem of gastric cancer.

The detection of cancers of the alimentary tract which are out of reach of the examining finger will not be easy even in Cancer Detection Clinics. But with careful interrogation of patients who appear for examination, together with hemoglobin determinations, a study of the stool for blood, an assay of the gastric juice for free hydrochloric acid, roentgen studies and gastroscopic studies in suitable cases, certainly gastric cancer will be diagnosed earlier with greater frequency than now. Moreover, such an approach to the problem of gastric cancer holds out far greater promise of improvement in the results of management of gastric cancer, for surgeons will then have an increased opportunity to make a better showing with the problem of gastric cancer.

Indifference and inertia are far more to be feared than the hazard of stirring up phobias of cancer. When the achievement of the surgeon in the treatment of cancer is better the public will fear the disease less. The relatives of patients for whose cancer I have been able to do little frequently ask how they can avoid the pitfall of seeking medical advice too late. My reply is: Go to your physician and be examined three or four times a year. To such a reply, from the wife of a patient for whom I had performed a palliative gastric resection for gastric cancer, I received a tearful letter which said in part: "I wish I could do something to awaken all doctors to the importance of the menace of cancer of the stomach. My husband saw five well-known men in this community during the past year.

46. Wilkie, D. P. D.: Early Diagnosis and Treatment of Gastric Cancer, International Conference on Cancer, London, Bristol, John Wright & Sons, 1928.

They examined him together with samples of his blood and urine. All of them said he was sound as a dollar. All he needed was a good rest. Not one suggested that he should have an x-ray examination of his stomach!"

The story of the insidiousness of gastric cancer is well told in this woman's letter. Only the coming of Cancer Detection Clinics, staffed by specialists in the whole range of medicine and strategically located, will reduce such occurrences to a minimum.

SUMMARY AND CONCLUSIONS

Cancer ranks only next to cardiac disease as a cause of death and takes an enormous toll of life. Approximately 150,000 persons die annually of cancer in this country, and there are probably at least 500,000 patients suffering from cancer at any one time in this country. Cancer is therefore a concern of the public health of the people of great importance.

The most frequently observed malignant growth is gastric cancer, which accounts for 25 to 40 per cent of all deaths due to cancer in countries with a population such as that of the United States, in which more than 20 per cent of the people are over 50 years of age. Cancer is statistically an important cause of death at every age, but its incidence increases significantly with advancing years. Autopsy figures suggest that in men over 20, 6 per cent of all deaths are due to gastric cancer; and in men between 50 and 70 years, 8.8 per cent of deaths are caused by gastric cancer. In women 4.3 per cent of deaths at autopsy in patients over 20 years of age are due to gastric cancer, and 5 per cent of all deaths in women between 40 and 70 years are caused by this disease.

The tragedy of the problem of gastric cancer is that too many patients come to the physician with the disease so late that surgery, the only worthwhile therapeutic agent, can hold out little hope. For the patient whose disease is local, surgical intervention promises a 20 to 25 per cent rate of cure. Inasmuch as the mortality of radical operation for gastric cancer in experienced hands is approximately 5 per cent, granted the early recognition of the disease the present gloomy prospect of gastric cancer could be much brighter.

The problem of gastric cancer is essentially one of earlier detection of patients in whom the lesion is developing. One cannot await the complete evolution of the clinical symptoms. If gastric cancer is to be diagnosed consistently in earlier stages than is done at present, patients of advancing years should be scrutinized periodically for evidences of cancer.

The establishment of Cancer Detection Clinics, staffed by specialists, affords the best promise of the early recognition of cancer. Women over 40 and men past 50 should report regularly to such clinics.

The solution of a difficult problem such as this demands the following:

1. Members of the medical profession must look at the problem realistically and learn to know all the facts bearing on it.

2. They must constantly enlarge their knowledge of the field by vigorous research and clinical investigation.

3. All available resources must be combined to lend pursuit of the inquiry the greatest promise of solution.

4. The solution of the problem must envisage an interest in the problem as it relates to the present generation as well as to those yet unborn.

The greatest hope for the present with reference to the cancer problem lies in the Cancer Detection Clinic. New discoveries as the result of a coordinated and energetic research program constitute the hope of the future.

On the occasion of the London International Conference on Cancer (1928) King George V [47] said: "I note with interest that your object is research, both into the cure and causes of cancer. No doubt in the last resort the discovery of the cause is the only certain and absolute means of cure. But I am glad that you have not ignored the practical side of the problem. Remembering the thousands of sufferers from cancer, I feel that if your discussions lead to advance in diagnosis, treatment or even palliation of the disease, this Conference will have justified itself and earned the gratitude of mankind."

Those well-chosen words of King George V spoken eighteen years ago at a general conference on cancer state the present day problem of gastric cancer very clearly. The immediate primary concern of the physician must be to strive to recognize gastric cancer earlier.

DISSEMINATED LUPUS ERYTHEMATOSUS AND DIFFUSE SCLERODERMA

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In 1942 together with Dr. Paul Klemperer we [1] employed the term "diffuse collagen disease" to indicate that in disseminated lupus erythematosus and in diffuse scleroderma, the basic morphologic changes were found in the connective tissues. Similar but less conspicuous changes in the connective tissues are observed also in rheumatic fever, periarteritis nodosa, rheumatoid arthritis, thromboangiitis obliterans and serum sickness. It must be emphasized that in each of these diseases this collagen degeneration may lead to conspicuous alterations in the walls and lumens of blood vessels, in the endocardium, pericardium and pleura, in the articular and periarticular tissues and in the dispersed connective tissues (mediastinum, retroperitoneum and subcutaneous tissues). Thus, in all the diseases of this group, one may encounter clinical evidences of vascular involvement, pericarditis, pleuritis and arthritis.

In recent years much emphasis has been placed on the fact that fibrinoid degeneration of collagen and the various vascular and visceral lesions to which it gives rise represent the "common denominator" of this group of diseases.[2] On such grounds it has been implied that the diseases are related or that they have a somewhat similar cause.

Fibrinoid degeneration of the connective tissues of the blood vessels, endocardium and synovial membranes can be induced experimentally by repeated intravenous injections of heterologous serum or of other protein or bacterial antigens.[3] From this, it has been urged that

47. George V.: King's Reply, International Cancer Conference, London, Bristol, John Wright & Sons, 1928.

From the Mount Sinai Hospital.
Read in a symposium on "Unusual Diseases" before the Section on Experimental Medicine and Therapeutics at the Ninety-Fifth Annual Session of the American Medical Association, San Francisco, July 3, 1946.

1. Klemperer, P.; Pollack, A. D., and Baehr, G.: Diffuse Collagen Disease, J. A. M. A. **119**: 331 (May 23) 1942.

2. (*a*) Bank, B. M.: New England J. Med. **225**: 433, 1941. (*b*) Teilum, G.: Acta med. Scandinav. **123**: 126, 1946.

3. (*a*) Gerber, I. E.: Shwartzman Phenomenon in the Kidneys of Rabbits, Arch. Path. **21**: 776 (June) 1936. (*b*) Rich, A. R.: Bull. Johns Hopkins Hosp. **71**: 123, 1942. (*c*) Rich, A. R., and Gregory, J. E.: ibid. **72**: 65, 1943; **73**: 235, 1943.

all those diseases in which fibrinoid degeneration of collagen is prominent may also be founded in allergy or para-allergy.[4] The purpose of this paper is to reconsider the clinical and pathologic manifestations of disseminated lupus erythematosus and diffuse scleroderma and to reexamine the evidence regarding their possible relationship with other "collagen diseases" [5] and more specifically with allergy.

DISSEMINATED LUPUS ERYTHEMATOSUS

Clinical Features.—It is now generally agreed that the erythema on the bridge of the nose and cheeks and other areas of the skin exposed to the trauma of strong sunlight and wind is the visible but not the primary manifestation of the disease.[6] Nor is this lesion responsible for the other alterations in the viscera. In fact, the cutaneous lesions for which the disease was named almost a hundred years ago may be absent throughout the entire course or may appear only in the terminal stage or during acute exacerbations of the illness.[7] Disseminated lupus is a prolonged febrile disease of the body as a whole, which, in the absence of cutaneous manifestations, may superficially resemble rheumatic fever and rheumatoid arthritis.

If the cutaneous rash has not made its appearance, the differential diagnosis may be extremely difficult. As in rheumatic fever and rheumatoid arthritis, weakness and a prolonged irregular fever are the most characteristic symptoms. Arthralgia and even arthritis are present from time to time, but are seldom as conspicuous as in the other two diseases. Suspicion of disseminated lupus erythematosus is warranted in a young woman with a prolonged undetermined fever, with or without migrating articular pains, if there is a consistent leukopenia and if red blood cells are found in the urine. During exacerbations of the disease, pyrexia may be high and, again as in rheumatic fever, there may develop in the patient the symptoms and signs of acute pericarditis or pleuritis or even abdominal pain.

The exacerbations, like the periods of remission, occur without obvious cause. They are usually marked by the appearance of albumin and red blood cells in the urine or, oftener, by the eruption or efflorescence on the bridge of the nose of erythematous macules, which tend to coalesce and spread in butterfly pattern over the cheeks. The rash may also extend to the chin, the superciliary ridges, the pinna and the V-shaped exposed manubrial area of the chest. The erythema may have a purplish tinge. Close examination with a hand lens often reveals superficial telangiectatic capillaries and petechiae. Erythematous macules of this type are observed in some severe cases also on the tips of the fingers and the toes, around the nail bed and scattered on the palms and soles. In extreme cases, erythematous areas may appear on the shoulders, elbows, knees, over the malleoli and, in fact, on any part of the body exposed to friction.

Generally speaking, during exacerbations erythematous patches, which appear on the mucous membranes, especially of the mouth, soon lead to shallow ulcerations and shortly proceed to healing. In this disease, unlike rheumatic fever, the lymph nodes are frequently enlarged. The spleen is seldom sufficiently enlarged to be palpable. Examination of the ocular fundi often reveals perivascular hemorrhages or fluffy exudates and occasionally, during exacerbations, circumpapillary edema. These retinal changes, possible manifestations of the widespread vascular injury, sharply distinguish lupus erythematosus from rheumatic fever and rheumatoid arthritis. The presence of leukopenia is always helpful in diagnosis. It is usually associated with moderate depression of hemoglobin, red blood cells, platelets and serum albumin. During intercurrent pneumonia or other secondary infections, it may be temporarily superseded by leukocytosis. During exacerbations of the disease the Wassermann test may become falsely positive or anticomplementary. Blood cultures are negative unless there is an intercurrent or terminal infection.

In this disease, in contrast to rheumatic fever, heart murmurs and the signs of congestive heart failure are absent or inconspicuous, and such murmurs usually disappear during remissions. When heart murmurs are audible during exacerbations it is difficult to ascribe them to verrucous endocarditis, for they may as readily be due to pyrexia, to anemia or to the effect on the myocardium of a long debilitating illness.

Pericarditis revealed by a friction rub is not uncommon during periods of exacerbation. Substernal pain may in some instances be due not to pericarditis but to involvement of the connective tissue of the mediastinum. For this reason, dysphagia may be an occasional complaint. The electrocardiogram is usually normal except for low voltage, characteristic of any prolonged debilitating illness. When pericarditis occurs, the electrocardiogram may then present the characteristic changes. Dry pleurisy is frequently observed during exacerbations. More infrequently there are episodes of abdominal pain which may be due to peritoneal serositis or to involvement of the retroperitoneal connective tissues.

Usually the disease runs its course to a fatal issue after a variable period, which may be weeks, months or years. Complete or partial remissions may last for months or years. A patient now under our care in an exacerbation has had the disease for more than nine years. We have seen several patients recover completely after a long and irregular period of illness, which at times seemed as if it would end fatally. One of the worst has now been well for eight years. We do not know the cause of the disease or the reason for recovery. However, although remissions are common, permanent recovery is unusual.

The most striking characteristic of disseminated lupus erythematosus is its predominant occurrence in young women; it may also occur in childhood. In our clinical material, 95 per cent of the patients were females. The few young males having the disease presented no sexual or endocrine abnormalities.

Pathologic Features.—It is not the purpose of this paper to describe in detail those changes in the tissues

4. Fox, R. A.: Disseminated Lupus Erythematosus: Allergic Disease? Arch. Path. **36**: 311 (Sept.) 1943. Zurbelle, E.: Deutsche med. Wchnschr. **70**: 12, 1944. Teilum.[2b]

5. (*a*) Klemperer, P.; Pollack, A. D., and Baehr, G.: Pathology of Disseminated Lupus Erythematosus, Arch. Path. **32**: 569 (Oct.) 1941; (*b*) New York State J. Med. **42**: 2225, 1942; footnote 1. In these previous publications we spoke of "systemic disease of the connective tissues," and "diffuse collagen disease." These are, of course, only convenient formulas not to be interpreted literally. We deal not with "disease of the connective tissues" but with disease of unknown nature in which the most important structural manifestations are found in the connective tissues. The modern conception of scurvy may offer a helpful analogy—a disease in which the deficiency of ascorbic acid results in failure to achieve the normal colloid state of the ground substance of the connective tissues (Wolbach, S. B.).

6. (*a*) Baehr, G.; Klemperer, P., and Schifrin, A.: Tr. A. Am. Physicians **50**: 139, 1935. (*b*) Baehr, G., in Cecil, R. L.: Textbook of Medicine, ed. 6, Philadelphia, W. B. Saunders Company, 1946.

7. It is important to emphasize that an erythematous blush on the bridge of the nose and cheeks in the absence of fever and other clinical evidences of a serious systemic illness is not sufficient to warrant a diagnosis of disseminated lupus erythematosus, for it may be observed in a variety of other conditions.

which are the morphologic expression of the disease, disseminated lupus erythematosus. This we have already done elsewhere.[8] At autopsy the gross examination is often disappointing, except when one encounters the characteristic endocardial lesions of Libman and Sacks.[9] It is for the microscope to reveal the connective tissue changes in the walls of small arteries, in the renal glomeruli, the skin, the mediastinum and in the subendothelial connective tissues of the endocardium, epicardium and other serous membranes. In the affected areas there is swelling of the connective tissue ground substance and fibrinoid degeneration of the collagen fibrils. The latter become swollen, straightened and often matted together into conglomerate masses of homogeneous refractile material which is intensely eosinophilic. In the most advanced phase, the connective tissue may become completely necrotic and basophilic fragments of nuclei, cytoplasm and fibrils become set in the eosinophilic ground substance.

When this fibrinoid swelling involves the basement membrane of the glomerular capillaries, the glomerular loops appear discrete and rigid, presenting what we have called a "wire loop" appearance.[6a] In other glomeruli in which the process is even more severe, the swollen collagen masses in some loops may undergo necrosis and present a superficial resemblance to embolic glomerular lesions of subacute bacterial endocarditis. When small arteries in the viscera appear necrotic, either totally or in their intimal, medial or adventitial coats, it is because the connective tissue cement substance which binds the intimal and muscular elements has suffered fibrinoid necrosis. The swollen fibrinoid ground substance may bulge into the lumen of the affected artery and, in association with desquamation and degeneration of the overlying endothelium, completely occlude the vessel. In other words, the vascular lesions in this disease occur by virtue of changes in the connective tissue substrate of the affected vessels.

Similar areas of fibrinoid degeneration in the subendothelial connective tissue of the epicardium are responsible for pericarditis; of the pleura, for pleuritis; of the peritoneum, for perisplenitis or perihepatitis. In the subendothelial connective tissue of the cardiac valves or in the endocardium of the auricles or ventricles, areas of swollen, eosinophilic altered collagen may lift up the endothelium and extrude above the surface to form coarse nodular verrucae (Libman-Sacks form of endocarditis[9]). Such vegetations on the valves or walls of the heart are to be seen macroscopically in 40 per cent of the necropsies. These verrucae are free of bacteria. One third of our cases showed a terminal bacterial infection of older verrucae, but the larger destructive lesions of bacterial endocarditis were not encountered. Aschoff bodies were not present in any of the hearts.

In the cutis, fibrinoid degeneration of the connective tissue and vascular lesions are not always prominent. However, the dilatation of capillaries and the escape of blood from them suggests a profound damage to the connective tissue matrix which supports these capillaries.

The dispersed connective tissues of the mediastinum, the retroperitoneum and the synovial tissues often exhibit fibrinoid degeneration.

Around the central arteries of the spleen, there is frequently found a collar of concentrically layered, sclerotic, connective tissue fibers. Occasionally this mantle may be so thick that it can be recognized grossly. This is the only site in which augmentation and sclerosis of the connective tissue obtains, rather than degeneration.

In addition to nonspecific hyperplasia, the lymph nodes may present small or large areas of necrosis (in the past mistaken for caseous tuberculosis).[10]

While it may be said that widespread changes in the connective tissues of the body represent the morphologic facet of disseminated lupus erythematosus and that these tissue changes frequently reveal themselves clinically as vascular lesions (e. g. cutaneous eruption, hematuria or vascular lesions of the ocular fundi), these changes are by no means uniformly observed. It must be remembered that the described changes in connective tissues are not uniform in each case. Most remarkable are the patients who die in what seems to be a profound toxic state. None of the conventional causes of death can be ascribed. There is neither cardiac nor renal failure. There is no obvious fatal cerebral disease. As a matter of fact, we have had the experience of the rejection by the Municipal Health Department of the diagnosis of disseminated lupus erythematosus written on a death certificate as the cause of death. "People do not die of lupus erythematosus." But they do. And in some of the postmortem examinations performed on these cases, but little change may be found in the viscera.

We are dealing, then, with a disease which may express itself morphologically in terms which are today recognizable only as fibrinoid degeneration of the connective tissues. This is but the structural symptom of the disease, whose essential nature is yet to be disclosed. Unfortunately, this has led to the dubious logic that since experimental hypersensitivity also produces fibrinoid degeneration of connective tissue, any disease in which fibrinoid degeneration of connective tissue is prominent must be allergic in origin.[2b]

DIFFUSE SCLERODERMA

This disease resembles disseminated lupus erythematosus in the widespread changes affecting connective tissue throughout the body. Like lupus, the cutaneous manifestations begin on the periphery, on the hands and feet, the bridge of the nose and cheeks, but they may then extend slowly and inexorably to involve all parts of the face, the extremities and even the trunk. The fingers first become stiff and the mouth puckered. The skin becomes smooth, hard and tight so that it cannot be lifted from the deeper structures, a picture that is never seen in lupus even if the condition has been present for years.

Although arthritis occurs in some early cases of diffuse scleroderma, more commonly the victims have previously been sufferers from attacks of vascular spasm in the hands, resembling Raynaud's phenomena. Low grade fever may at times be present without obvious intercurrent infection, although usually the temperature is normal. After periods of exacerbation and sometimes remission, death ensues following years of progressive debility.

The peculiar sclerosis of the skin gradually results in more or less complete immobility of the joints of the fingers, hands, maxilla and sometimes even larger

8. Klemperer, Pollack and Baehr.[6a] Baehr, Klemperer and Schifrin.[6a]
9. Libman, E., and Sacks, B.: A Hitherto Undescribed Form of Valvular and Mural Endocarditis, Arch. Int. Med. **33**: 701 (June) 1924.
10. Ginzler, A. M., and Fox, T. T.: Disseminated Lupus Erythematosus, Arch. Int. Med. **65**: 26 (Jan.) 1940.

joints. Partly due to the complete immobility of the hands and fingers in a claw position, but probably more because of interference with circulation through the digital arteries, the phalanges undergo extreme rarefaction, and their peripheral ends may atrophy to mere points. Meanwhile, the degenerated and fibrosed periarticular tissues of the phalangeal joints may become heavily infiltrated with lime so as to form large periarthritic tophi. Broad areas of brownish pigmentation often develop, especially on the dorsum of extremities.

In the skin, areas of fibrinoid degeneration may be seen microscopically, but the predominant change, even from the start, is a diffuse sclerosis of the epidermal and even subcutaneous connective tissue. The similar sclerotic process in the connective tissue of the esophagus may interfere seriously with its motility.

Clinically, we can see little resemblance between diffuse scleroderma and disseminated lupus erythematosus, nor has the former the characteristic female predominance of lupus. Their resemblance is rather in the fact that both diseases involve the connective tissue of the entire body and, although sclerosis is characteristic of scleroderma from the start, fibrinoid degeneration also occurs. This fibrinoid degeneration of collagen can be observed in the walls of small arteries, as Masugi [11] first reported. The pathologic changes in the arteries, in the subendocardial and epicardial connective tissue and in the glomeruli observed in diffuse scleroderma are identical with those which we have described in disseminated lupus, including the "wire loop" lesions and focal necrosis of glomerular tufts.[12]

ALLERGY AND SERUM SICKNESS

Gerlach [13] described fibrinoid degeneration of collagen fibrils in the Arthus phenomenon, and he and others have since regarded it as an essential feature of hyperergic inflammation. This form of connective tissue alteration has been frequently observed in animals which have been sensitized by repeated intravenous injections of bacterial or heterologous serum proteins.[14] Such experimental observations have been repeated most recently by Rich [3c] who assumed that he had thereby reproduced the pathologic lesions of rheumatic fever. He also observed these lesions in serum sickness and other conditions associated with allergy.[3b] This is in line with the former theoretic conclusions of Klinge,[14] Roessle [15] and Jaeger,[16] who group rheumatic fever, periarteritis nodosa and even thromboangiitis obliterans in a common rheumatic category and regard them as different manifestations of an allergic or hyperergic state, chiefly because of the common occurrence of foci of fibrinoid degeneration in all these diseases and in experimental allergy. The most recent support for this conception comes from Teilum [2b] who has added disseminated lupus erythematosus to the rheumatic or pararheumatic group of diseases. He has assumed that all diseases with lesions showing fibrinoid degeneration are essentially of allergic character, and he has explained the different clinical and pathologic characteristics of these diseases by the theory that the connective tissue reacts somewhat differently to the various allergens.

The proponents of the allergy hypothesis are protected in their theory by the fact that the specific provocative agent is still unknown in all these diseases except thromboangiitis obliterans, which is thought to be related to tobacco smoking. However, against their hypothesis stands the fact that typical fibrinoid degeneration is commonly seen in the walls of arteries in malignant hypertension and that it can be reproduced experimentally in animals in whom arterial hypertension is induced by the Goldblatt experiment, artificial reduction in the blood supply of the kidneys. In such experiments there can be no question of allergy. Fibrinoid degeneration can also be reproduced by injection of organisms of low virulence and of chemical agents into connective tissue.[17] It may often be seen in the reacting connective tissue adjacent to a foreign body and in the base of a peptic ulcer.[18]

It must be remembered that connective tissue is the supporting and cementing framework of all the organs and tissues of the body, that it consists essentially of collagen laid down in fibrils and of a ground substance, and that it has only three basic ways of reacting to injury—by degeneration, fibrosis, cellular reaction or all three. Degeneration may be expressed as swelling of the ground substance, fibrinoid changes in the collagen fibrils and in the extreme stage as necrosis. Fibrinoid degeneration may occur in any type of connective tissue injury with or without fibrosis or cellular reaction, and in itself, as Klinge emphasized,[14] it is not specific for any one type of injury.

The occurrence of fibrinoid degeneration in the Arthus phenomenon, in serum sickness and after sensitization to bacterial or heterologous serum antigens is insufficient ground for the assumption that disseminated lupus erythematosus and diffuse scleroderma must be the result of a hyperergic state induced by an unknown agent. The hypothesis brings us no nearer to the discovery of the cause of these diseases. Furthermore, it is entirely unsupported by clinical evidence. In all our long experience with these diseases we have never encountered a lupus patient with eosinophilia, urticaria, asthma or any other clinical manifestation of allergy. This is in striking contrast to the observations in periarteritis nodosa.

PERIARTERITIS NODOSA

Clinically, there has long been little reason to doubt that many cases of periarteritis nodosa are examples of an allergic or hyperergic state, in which the pathologic effects are most conspicuously focused on the medium sized arteries.[19] Unlike disseminated lupus, the condition occurs in both sexes, with slight predominance in males. The disease is frequently preceded by attacks of urticaria, asthma or other clinical manifestations of allergy, and pronounced eosinophilia is commonly present in the acute phase. Finally, the condition can be readily reproduced in experimental animals by injections of a sensitizing antigen.[3b, c]

In periarteritis nodosa the degeneration of collagen is limited to the vessel walls, and it is always accompanied in the acute stage by a conspicuous cellular inflammatory reaction in the adventitia and media, in which the participation of eosinophils is noteworthy. We have observed perivascular infiltration of vessels in lupus

11. Masugi, M., and Ya-Shu: Virchows Arch. f. path. Anat. **302**: 39, 1938.
12. Pollack, A. D.: Visceral and Vascular Lesions in Scleroderma, Arch. Path. **29**: 859 (June) 1940.
13. Gerlach, W.: Virchows Arch. f. path. Anat. **247**: 294, 1923.
14. Klinge, F.: Ergebn. d. allg. Path. u. path. Anat. **27**: 1, 1933. Klinge, F., and Vaubel, E.: Virchows Arch. f. path. Anat **281**: 701, 1931
15. Roessle, R.: Virchows Arch. f. path. Anat. **288**: 780, 1933; Klin. Wchnschr. **15**: 809, 1936.
16. Jaeger, E.: Virchows Arch. f. path. Anat. **284**: 526, 1932.
17. Schosnig, F.: Virchows Arch. f. path. Anat. **286**: 291, 1932.
18. Askanazy, M.: Virchows Arch. f. path. Anat. **234**: 111, 1931.
19. Gruber, G.: Virchows Arch. f. path. Anat. **258**: 441, 1925.

erythematosus only where there was complete necrosis of an arterial wall. Although this occasional lesion may resemble periarteritis superficially, the cellular infiltrate contains no eosinophils. In lupus erythematosus the participation of vessels represents but one phase of a general involvement of the connective tissues of the entire body. On the other hand, in only 1 of our cases of periarteritis nodosa was degeneration of collagen found outside the cardiovascular system.

RHEUMATIC FEVER

In spite of the fact that fever and arthritis may at times be the only clinical manifestations of disseminated lupus erythematosus, thus making a differential diagnosis from rheumatic fever difficult, the two diseases are otherwise clinically dissimilar. Although in persons who have once had acute rheumatic cardiac disease there may sometimes develop disseminated lupus years later, we have not yet observed the simultaneous occurrence of these diseases. The leukopenia, the cutaneous and oral lesions, the retinal lesions, the clinical evidences of renal vascular injury and the almost exclusive female predominance of disseminated lupus erythematosus are not seen in rheumatic fever or in rheumatoid arthritis.

In rheumatic fever similar but much less extensive foci of fibrinoid degeneration of collagen are to be found, chiefly in perivascular spaces of the myocardium, in the subendothelial layers of the valves and only occasionally in the walls of arteries. In rheumatic fever the smaller foci of collagenous degeneration characteristically call forth a striking cellular response with the production of Aschoff bodies in the myocardium. In disseminated lupus there is little cellular proliferation in the affected areas of fibrinoid degeneration and we have never seen Aschoff bodies. If proliferating fibroblasts are encountered in the fibrinoid areas, they already exhibit striking degenerative changes. In rheumatism, especially in the cardiac valves, the proliferation of fibroblasts is progressive and almost from the beginning associated with the production of new fibrous tissue. Similarly, even in the most advanced stages of rheumatic fever, the process never affects the basement membrane of the glomerular capillaries; the wire-loop lesions and focal necrosis of glomerular loops, so characteristic of erythematous lupus, are never seen in rheumatic fever.

CONCLUSIONS

1. The connective tissues serve not only as a supporting and binding substance for all the other tissues of the body but also as the medium through which all humoral and metabolic exchange between the blood and other tissues takes place. They can react to injury in three basic ways: by fibrinoid degeneration or necrosis, by fibrillar augmentation or sclerosis, by cellular proliferation or by a combination of these changes.

2. Fibrinoid degeneration of collagen can occur both as a general or as a local expression of injury, in a variety of heterogeneous and dissimilar disease processes.

3. Fibrinoid degeneration of collagen is, therefore, not a pathologic process of sufficient specificity to serve as a reliable common denominator for the classification of disease. It certainly does not warrant the grouping of all such conditions into a common category of allergic diseases.

4. Disseminated lupus erythematosus and diffuse scleroderma have in common a similar morphologic expression, namely, fibrinoid degeneration of collagen and identical lesions of blood vessels, glomeruli, endocardium and the serous and synovial membranes. However, they are so dissimilar clinically that they seem related neither to each other nor to rheumatic fever, rheumatoid arthritis, serum sickness, periarteritis nodosa or thromboangiitis obliterans, in which similar collagen changes may occur as part of the pathologic process.

5. Acceptance of an allergic basis for these two diseases without other supporting evidence serves merely to discourage other avenues of investigation into their essential nature.

ABSTRACT OF DISCUSSION

DR. PAUL O'LEARY, Rochester, Minn.: I agree with Dr. Baehr that disseminated lupus erythematosus and scleroderma do not have a common etiologic agent and that fibrinous degeneration of the collagen is an end result, not a specific pathologic reaction, and may result from the effect of various noxae in diseases that are quite dissimilar. Clinically dividing lupus erythematosus into the chronic, subacute and acute forms helps materially in prognosticating the course of the disease, because patients who have the acute type of the disease may die within a period of months. Occasionally those with the acute type may adopt the subacute form and may live for some time; in occasional cases they may assume the chronic form and remain as modified invalids for many years. It is well to repeat for emphasis a point which Dr. Baehr made, namely, that the cutaneous lesions are by no means an indication of the toxicity of the lupus erythematosus process, because even though the cutaneous lesions may be minimal the patient may die within a period of several months from disseminated lupus erythematosus. Therapeutic castration of women who have disseminated lupus erythematosus has been valueless in my experience. Also, disseminated lupus erythematosus, during its phases of activity, has never resembled scleroderma. However, I do believe the clinical picture of disseminated lupus erythematosus will frequently resemble that of dermatomyositis, in which one occasionally sees various manifestations of scleroderma. In patients with the chronic type of disseminated lupus, those who have obtained a remission, the ensuing generalized atrophy of the skin is often difficult to differentiate from the end stage of scleroderma, but otherwise I do not know of any other factor which these diseases have in common. Scleroderma with its various and sundry clinical manifestations is a symptom complex probably due to various agents. The end process of many diseases belies their etiologic basis.

DR. GEORGE BAEHR, New York: Since this is an audience of clinicians, I wish to emphasize again that the presence of a butterfly rash on the face is not sufficient evidence on which to base a diagnosis of the disease. Evidences of a constitutional illness must also be present, for an erythema at this location may be due to other causes. Furthermore, if clinicians only study patients referred to them by dermatologists, they will see only those that have the rash. If they keep in mind the fact that not infrequently the disease occurs without any rash and that throughout a long course there may be no rash until the terminal exacerbation, they will frequently recognize cases. At least one third of the patients that we have seen were observed and the disease diagnosed before the cutaneous rash appeared. A few ran their entire clinical course without a rash, and in 1 case which we studied over a prolonged period the rash was limited to the hands. On making the diagnosis of a patient without a rash, prolonged fever, decided debility, and red blood cells in the urine are evidences of the visceral lesions; leukopenia is also diagnostically significant. Vascular lesions are often visible in the ocular fundi, and they should be searched for regularly. The Wassermann test is often falsely positive, and it may fluctuate from negative to falsely positive and back again. Coburn and Moore thought this was due to the rise in euglobulin, but I doubt whether this can be the explanation, in view of its fluctuating variability. It has nothing to do with syphilis. Dr. O'Leary has reemphasized the importance of the

sex predisposition. As I stated, more than 95 per cent of our patients were women. It has not been our experience that treatment with testosterone propionate or castration in females materially altered the course of the disease. Exacerbations and remissions in this disease are so common that it is difficult to draw any conclusions as to the result of such therapy. It is our impression that they have not been successful. We cannot ascribe the remissions that we have observed, sometimes long remissions over many years, to the use of extremely large dosages of testosterone propionate or radiologic castration. Similarly, there are no endocrine disorders to be observed in women, no menstrual disorders, although as a result of increasing debility or secondary anemia amenorrhea may develop symptomatically. Also, in men we have seen no evidence of endocrine disorder. We are obliged to conclude that the female predominance merely represents a sex predisposition and is not the essential factor. It is perhaps equivalent to the male predisposition for thrombo-angiitis obliterans.

Clinical Notes, Suggestions and New Instruments

RECTAL COMPLICATIONS OF EPISIOTOMY

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In the past year or two we have treated 3 patients who had rectal complications manifested soon after episiotomy. Two of the patients had typical fistulae in ano, and the third had rectal pain but no definite fistula. A brief summary of their histories will be given later.

Although rectal complications of episiotomy seem of minor importance, they are extremely annoying and are of great concern, especially since they follow the ordeal of childbirth.

An attempt was made to review the literature on the subject, but apparently little has been written, since only one such article was indexed at the Surgeon General's library. That article was by Dr. J. J. Corbett,[1] who in 1938 reported 6 cases of rectal fistulas which developed after episiotomy. Because of the paucity of reports, in spite of the fact that these complications are not uncommon, we will attempt to outline briefly the most probable causes and the treatment of these complications.

Undoubtedly, episiotomy has been a definite advance in that it prevents rectal injuries due to extensive lacerations of the perineum; however, the operation itself may cause certain rectal disorders such as perianal abscess, fistula in ano, rectovaginal fistula and painful scars.

ETIOLOGY

Most of the complications follow infection of the episiotomy wound. In a study of 2,987 consecutive episiotomies, Kretzschmar and Huber[2] stated that infections occurred in 2.5 per cent when silkworm-gut was used and in 1.3 per cent when catgut was used. Pain develops a few days after the operation; this is followed by redness, edema and tenderness of the wound, which eventually ruptures and drains frank pus, usually through the episiotomy scar. This relieves the symptoms but is followed by a persistent opening which closes and reopens at intervals. Subsequent abscesses may also occur. How does this infection start? A satisfactory explanation is that while the episiotomy wound is being sutured, a suture is inadvertently passed too deeply. It pierces the rectal wall, goes through the mucosa and then passes back through the episiotomy wound, carrying the rectal flora with it. Thus the needle hole itself can be the future internal opening of the fistula in the rectum, and the external opening will either be one of the external needle openings or be present in the center of the episiotomy scar. This complication can be avoided by keeping a gloved finger in the rectum when placing the deep sutures or by doing a rectal palpation after placing the sutures. If the latter is done and a suture is palpated in the rectum, the suture should be cut in the episiotomy wound and withdrawn through the rectum. If the suture is drawn out through the wound itself it will contaminate the area by dragging the rectal portion into the open wound, thus inoculating it with pathogenic organisms.

Rectovaginal fistulas may develop after infection of the episiotomy wound. In this condition a tract extends between the rectum and the vaginal mucous membrane, in contrast to fistulae in ano, in which the tract extends from the rectum to the perianal skin.

TREATMENT

When tenderness and edema of the episiotomy scar are present and infection has started, hot applications are exceedingly helpful in the relief of pain and in the localization of the abscess. Often the wound ruptures of its own accord. Early incision through the scar will prevent burrowing of the pus and greater involvement. Occasionally there may be a low grade infection, and the wound may heal without the formation of a fistula.

In the performance of an incision and drainage for abscess, it would seem advisable to identify and treat the fistula at the same time. However, the tissues are usually edematous and the internal opening is usually sealed off, so that its identification is difficult and the procedure is not practical. After a few days, when the edema subsides and the pus is evacuated, the internal opening can be felt in the rectum just above the sphincter as a tiny hardened pea-sized area. To cure the fistula the internal and external openings should be connected by passing a soft probe gently through the external opening into the rectum and incising boldly down to the probe. This lays the tract wide open and allows it to heal over by granulation. It is not necessary to excise the tract itself. To prevent the incontinence due to complete division of the sphincter, a seton can be threaded around the sphincter and through the internal opening, then tied and left intact. At a later date, after some healing has occurred by granulation, the sphincter should be divided with the patient under local anesthesia, freeing the seton. This can be done in the office without greatly incapacitating the patient. Postoperatively, in addition to the routine of sitz baths, it is most important to see the patient frequently enough to do digital rectal dilatations in order to prevent too rapid bridging of the defect, which may result in the formation of closed-off areas which can subsequently abscess.

REPORT OF CASES

Case 1.—Mrs. H. R., a white woman aged 22, was first seen two months post partum. She was a primipara who had a thirty hour labor and an episiotomy. Three days post partum the patient began to have severe pain in the region of the rectum; this persisted for two weeks. An abscess formed in the peritoneum and was opened. The pain continued intermittently. At the time of examination the patient complained of pus and fecal drainage from the perineal region. Examination revealed two small pinpoint openings, which were about 1 cm. apart and just to the right of the episiotomy scar. An excision of the fistula in ano was performed. The two openings were connected, and then a probe was passed into the rectum and an incision was made to connect the internal and external openings. The patient had a normal convalescence, and the wound healed without discomfort.

Case 2.—Mrs. M. Y., a white woman aged 31, was seen six months post partum, having had a normal delivery and an episiotomy. The patient complained of some tenderness in the region of the episiotomy for several weeks. She had noticed some pus draining from the perineal region. Examination revealed a tiny furuncle-like area on the left side of the perineum. When this was opened a probe was easily passed along a sinus tract into the rectum. With the patient under local anesthesia, an incision was made down to the muscle and a seton was placed through the internal opening around the sphincter. Twenty days later the seton was removed with the patient under local anesthesia after the tract had been cut through. Recovery was uneventful.

1. Corbett, J. J.: Rectal Fistula Complicating Episiotomy, Harper Hosp. Bull. 1: 7-9 (Oct.) 1941.
2. Kretzschmar, N. R., and Huber, C. P.: Study of 2,987 Consecutive Episiotomies, Am. J. Obst. & Gynec. 35: 621-626 (April) 1938.

CASE 3.—Mrs. C. W., a white woman aged 19, was seen five weeks post partum, having had a high forceps delivery and an episiotomy. The patient complained of severe pain in the rectum since the birth of her baby. Examination revealed that the perineal wound was entirely healed. There was no evidence of inflammation or tenderness. No fistula was present. On examination of the rectum two pea-sized areas were palpated on the left side in line with the episiotomy. The patient was high strung, and it was difficult to evaluate her complaint of rectal pain. The two tiny pea-sized areas in the rectum probably represented a place where a suture went through and healed by the formation of scar tissue but did not form an abscess with subsequent fistula. As the scar was well healed it did not seem justifiable to excise the scar or the indurated areas in the rectum. At present the patient does not complain strongly, but she still speaks of some discomfort in the region of the rectum.

CONCLUSION

Perianal abscesses with resultant fistulas do occur in a small number of cases following episiotomy. Such a sequela should be kept in mind.

EXCESSIVE SELF MEDICATION WITH NAPHAZOLINE HYDROCHLORIDE ("PRIVINE HYDROCHLORIDE")

PAUL S. MERTINS Jr., M.D.
Montgomery, Ala.

Rhinitis medicamentosa is a condition frequently associated with allergy or sinusitis. Recently, however, there have been an increasing number of unusually severe cases associated with nervous manifestations following excessive self medication with naphazoline hydrochloride ("privine hydrochloride" N. N. R.).

REPORT OF CASES

CASE 1.—A healthy man aged 28, who had been well until four months before, began using "solution privine hydrochloride 0.1 per cent" for a cold at the recommendation of a friend. His stuffiness became worse until he was using about 2 ounces (59 cc.) a week. He had lost 20 pounds (9.1 Kg.), was unable to sleep and was so nervous that he thought he was having a breakdown. Examination of the nose showed the turbinates to be grossly swollen; they were the dead gray color and the consistency of bubble gum. They could not be shrunk even by a mixture of cocaine hydrochloride and epinephrine ("adrenalin" N. N. R.). The sinuses were clear to transillumination, the sedimentation rate was normal and nasal smears did not suggest allergy. Results of physical examination and extensive laboratory examination were otherwise within normal limits. The patient was put on a regimen of sedatives, steam inhalations and ephedrine by mouth. After a stormy ten days he began to improve. One month later he reported that he was taking no medicaments and was gaining weight; his nervousness was gone. The nose looked normal.

CASE 2.—A child aged 3 years had increasing stuffiness of the nose following a cold six weeks before. During the previous week the mother had become alarmed by a nervous twitching and an impediment in speech. The mother stated that she was using "privine" full strength "by the gallon" (a prescription of her own) and that the child cried for it. There was no warning note on the bottle. All medicaments except a dilute solution of sodium chloride were discontinued. At the end of a week both the nose and the nervousness were improved.

CASE 3.—A young woman with mild chronic allergic rhinitis stated that she could not live without "privine" and used it every two hours. Her nasal tissues completely blocked the air passages and showed the dead gray color of rhinitis medicamentosa due to this drug. She was extremely nervous, had lost 8 pounds (3.6 Kg.) and for the past month had not been able to sleep without the use of sedatives. The blood pressure was 120 systolic and 80 diastolic. Medication with naphazoline hydrochloride was discontinued, but sedatives were given. Three days later the patient collapsed; the blood pressure was 85 systolic and 50 diastolic. At her insistence naphazoline hydrochloride was started again, and withdrawal of the drug is being attempted gradually.

COMMENT

These cases are not exceptional, but are characteristic of those which many rhinologists and allergists are seeing daily. Pharmacists report the impression that self medication with this agent is excessive and is increasing rapidly.

Differential diagnosis between sinusitis, allergic rhinitis or nasal psychoneurosis, with which it may be associated, is essential because the patient, as in most cases of rhinitis medicamentosa, will insist that the drug is his only help and will seldom recognize the true cause of his condition. Continuation or increase of his use of the medicament will eventually result in severer manifestations of disease.

Treatment consists in the withdrawal of the nasal medicament as rapidly as is consistent with the patient's health and will result in a cure comparable to the previous condition of the nose in from a week to three weeks. Sedatives, steam inhalations and mild protein silver ("argyrol") packs only ameliorate the severe discomfort of the first few days. I have found that other types of nose drops will not give relief and only seem to hinder the healing. Antihistaminic agents and sulfonamide compounds have usually been given to the patients previously by friends. These drugs are of no benefit except for complications. The administration of ephedrine by mouth often increases the nervousness of the patient.

The purpose of this report is not to condemn the ethical use of an excellent product but simply to warn that its uncontrolled abuse may result in serious disease, which can be diagnosed early if it is considered.

SUMMARY

1. Rhinitis from excessive self medication by naphazoline hydrochloride ("privine hydrochloride") is a rapidly increasing entity in allergic and nasal practice.

2. It produces a severe gray rhinitis of a most refractory nature with a severer form of nervousness than one would expect to result from nasal obstruction alone.

3. It is easily diagnosed by history and examination but must be distinguished from its complications.

4. Treatment, which consists in withdrawal of the medicament, will result in cure but is uncomfortable.

32 Clayton Street.

Council on Physical Medicine

The Council on Physical Medicine has authorized publication of the following report. HOWARD A. CARTER, *Secretary.*

GENERAL ELECTRIC INFRA-RED HEAT LAMPS ACCEPTABLE

Manufacturer: General Electric Company, Cleveland 12.

The General Electric Infra-Red Heat Lamps are self contained units and screw into any conventional socket. The conical bulb is coated with aluminum on the inside, making a reflector. The face of one model is made of lightly frosted glass and the other is red glass. The heat radiation from this lamp has therapeutic value, but the firm does not claim any special therapeutic benefit from the frosted or red glass faces (filters). The tungsten filament at the focus of the reflector draws 250 watts. The spectral intensity measurements presented by the company are characteristic of the radiation emitted by any incandescent tungsten. The Council has confirmed these data.

The generators, in the opinion of the Council, may be employed efficaciously whenever radiant heat is indicated. They may be prescribed by a physician for use in the home.

The Council on Physical Medicine voted to include the General Electric Infra-Red Heat Lamps in its list of accepted devices.

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SATURDAY, AUGUST 2, 1947

NEW CONCEPTS IN THE TREATMENT OF RELAPSING MALARIA

The prevention of relapses in malaria remains largely an unsolved problem despite the development of new and more potent antimalarial drugs. The probability of radical cure in an individual, or of cures in a group, Sapero [1] believes is determined by the factor of drug efficacy plus the factor of host immunity. The net effect of these is reduced or augmented by a third factor, the inherent characteristics of the species or strains of malaria concerned. Thus the attainment of radical cure either in an individual or the percentage of such cures in any group is not solely a matter of exact therapeutic method, as is commonly believed.

The variability of immune response is demonstrated by the fact that some persons who acquire malarial infection may experience complete cure without the benefit of drug therapy, while others fail to attain a radical cure despite the curative effects of both treatment and immune response. In this group fall the cases of relapsing malaria.

The four species of plasmodia which cause human malaria have distinctive qualities. Individual species of plasmodia and certain individual strains of a single species show inherent differences in their pattern of relapse in the human host and in their susceptibility to drugs. Plasmodium ovale, for example, is distinctive in that infections caused by it show little tendency to relapse and exhibit a high degree of drug susceptibility. Remarkably small doses of quinine usually suffice to bring about radical cure. Plasmodium vivax infections, in contrast to those caused by Plasmodium ovale, exhibit a strong tendency to relapse. The usual course in vivax infections is that shortly after recovery from the primary attack a series of relapses takes place. Then there follows a period of clinical latency. Usually this lasts from seven to eleven months, after which another series of relapses may occur. These distinctive qualities are exhibited not only by the species but also by certain individual strains of P. vivax, which also vary in their response to treatment. These characteristics of species and strains appear to be of a remarkably stable nature.

Most workers in this field, Sapero points out, explain the mechanism by which distinctive relapse patterns are exhibited by various species and strains of plasmodia by accepting a hypothetical principle which postulates the existence of an exoerythrocytic cycle in man. Thus relapses in malarial infections are said to be of two types: those which follow as a result of parasitic activity in the exoerythrocytic cycle and those which follow from renewed parasitic activity in the conventional erythrocytic cycle. A new version of parasitic activity in man is that, following inoculation, sporozoites enter fixed tissue cells, where the parasites are believed to undergo a distinct cycle of development, a so-called exoerythrocytic cycle; subsequently they are discharged into the blood stream and there begin the erythrocytic cycle. Persistence of infection and relapse are both closely linked with the exoerythrocytic development of parasites. Relapses are conceived to follow periodic discharges of tissue forms into the blood stream.

Chemotherapeutic agents in general use in malaria exhibit a highly selective action. Drugs capable of eradicating trophozoites of the erythrocytic cycle are incapable of a like action on preerythrocytic forms. Conversely, drugs potent against preerythrocytic parasites are largely without effect on erythrocytic forms. Quinine, quinacrine and chloroquine, as far as practical benefit against asexual forms is concerned, are active only on erythrocytic forms. Plasmochin and pentaquine act exclusively on exoerythrocytic forms. The newer approach demands that therapy be directed toward the prevention of the exoerythrocytic type of relapse as well as toward the erythrocytic type. Either a single drug must be discovered which has the dual capacity of acting against the parasites of both exoerythrocytic and erythrocytic phases, or a combination of two drugs which will accomplish the same result must be used. Paludrine appears unique, since it represents the first discovery of a drug which has appreciable dual activity against both erythrocytic and exoerythrocytic forms. Some success has been achieved by the simultaneous use of combining quinine with plasmoquine or pentaquine. This combination provides an attack on forms of both cycles.

Sapero concludes that the problem of preventing relapses depends much on the understanding of the possibility of an exoerythrocytic cycle in man and of the two types of reactivation: the exoerythrocytic relapse and the erythrocytic recrudescences. Radical cure of the infection involves the use of drugs capable of both exoerythrocytic and erythrocytic activity. Drug susceptibility and the pattern of relapse appear to be the essential elements peculiar to species or strains of species which are important in determining whether cure or clinical reactivity will follow.

1. Sapero, J. J.: New Concepts in the Treatment of Relapsing Malaria, Am. J. Trop. Med. **27**: 271 (May) 1947.

INFLUENZA VACCINES

Less than thirty years ago more than 21,000,000 people throughout the world died of a pandemic disease the cause of which at that time was unknown. Human influenza virus was discovered by Smith, Andrewes and Laidlaw [1] in 1933. The possibility of a major epidemic during World War II led to experiments on producing, on a large scale, a vaccine which would protect our armed forces and civilians against influenza. The first vaccine prepared on a large scale contained inactivated influenza virus obtained by the elution of adsorbed virus from chick red cells.[2] This vaccine produced protection against influenza, but it contained about 80 per cent of impurities in the form of nonvirus protein materials. The second vaccine produced on a large scale was prepared by the selective removal of inactivated virus from the extraembryonic fluids of the infected chick embryo by high speed centrifugation.[3] This method yielded a vaccine containing few impurities and consisting almost wholly of purified inactivated virus. The centrifuge method was accepted by the U. S. Army in April 1945 as an alternative for the adsorption and elution method used during the preceding year. The Army was vaccinated against influenza in the fall of 1945, and where comparative results were obtained they indicated that influenza among the vaccinated was very much less prevalent than it was among the nonvaccinated.[4]

In the meantime two additional influenza vaccines have appeared on the market, one consisting of inactivated virus precipitated on calcium phosphate [5] and the other of inactivated virus precipitated on protamine.[6] Four different influenza vaccines are available therefore at present, all prepared from the extraembryonic fluids of infected chick embryos and containing both type A and type B influenza viruses inactivated with solution of formaldehyde. The fluids however are processed by different methods and yield vaccines which differ in their content of impurities or nonvirus materials. The centrifuge method, Stanley [3] found, yields the purest product, and in addition the yield and the possible concentration of virus are greater.

In a study of allergic reactions produced in children by the eluate-type influenza vaccine, Ratner and Untracht [7] found that the positive reactions were related in large measure to the egg protein in the vaccine. A few of the suggestive reactors were shown to be sensitive to the solution of formaldehyde and not to egg. It was suggested that vaccines produced from chick embryos should not be given to persons who are highly sensitive to egg protein. They recommended that all persons be tested intradermally with 0.02 cc. of undiluted vaccine before the administration of each prophylactic dose of vaccine. Although its occurrence is rare, profound or fatal anaphylaxis has resulted from the use of influenza vaccine in untested patients. With respect to potential allergic reactions the centrifuge-type vaccine has definite advantages over the other three types. The reactions produced by the centrifuge-type vaccine in a highly egg-sensitive person were found to be far less than those produced by the eluate-type of influenza vaccine.[8] It seems obvious therefore that the most highly purified vaccine, the centrifuge-type, should be used whenever possible. Its manufacture and sale to civilians are not restricted by patents.

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2. Francis, T., Jr., and Salk, J. E.: A Simplified Procedure for the Concentration and Purification of Influenza Virus, Science **96**: 499, 1942.
3. Stanley, W. M.: The Preparation and Properties of Influenza Virus Vacines Concentrated and Purified by Differential Centrifugation, J. Exper. Med. **81**:193 (Feb.) 1945; The Efficiency of Different Sharples Centrifuge Bowls in the Concentration of Tobacco Mosaic and Influenza Viruses, J. Immunol. **53**: 179 (June) 1946.
4. Francis, T., Jr.; Salk, J. E., and Brace, W. M.: The Protective Effect of Vaccination Against Epidemic Influenza B, J. A. M. A. **131**: 275 (May 25) 1946. Hirst, G. K.; Vilches, A.; Rogers, O., and Robbins, C. L.: The Effect of Vaccination on the Incidence of Influenza B, Am. J. Hyg. **45**: 96 (Jan.) 1947.
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6. Chambers, L. A., and Henle, W.: Precipitation of Active Influenza: A Virus from Extraembryonic Fluids by Protamine, Proc. Soc. Exper. Biol. & Med. **48**: 481, 1941.
7. Ratner, Bret and Untracht, Samuel: Allergy to Virus and Rickettsial Vaccines: I. Allergy to Influenza A and B Vaccines in Children, J. A. M. A. **132**: 899 (Dec. 14) 1946.
8. Malkiel, S.: Personal communication.

Current Comment

FATIGUE AND SWEATING

The maintenance of efficiency under conditions of high temperature and humidity is dependent on the ability to maintain the rate of sweating. The factors which control the rate of perspiration have been studied by Gerking and Robinson,[1] who caused experimental subjects to do a constant amount of work on a treadmill under controlled conditions of temperature and humidity. If the initial rate of sweating was moderate, 600 to 800 Gm. per hour, it was maintained for a long period. If, however, the initial rate was about 1,400 Gm. per hour, the sweating rate declined from 10 to 80 per cent by the sixth hour of the experiment. The decline in sweating rate was greater in humid than in dry heat and also greater when men wore army tropical uniforms than when they wore only shorts. Water balance was maintained by ingestion of 0.1 per cent sodium chloride solution. The decline of the rate of sweating is probably due to some sort of fatigue of the sweating process. It results in failure of the cooling mechanism and a rise of body temperature of about 2 degrees centigrade.[2] The sodium chloride content of the sweat becomes greater (more like the plasma) as work is prolonged. Best performance is achieved by replacing hour by hour the water lost in the sweat. Replacement of salt or of glucose on an hour by hour basis is of little advantage compared with water replacement.[3]

1. Gerking, S. D., and Robinson, Sid: Am. J. Physiol. **147**: 370 (Oct.) 1946.
2. Robinson, Sid, and Gerking, S. D.: Fed. Proc. **5**: 88, 1946.
3. Pitts, G. C.; Johnston, R. E., and Consolozio, F. C.: Am. J. Physiol. **142**: 253 (Sept.) 1944.

CANCER OF THE LUNGS IN PULMONARY TUBERCULOSIS

Tuberculosis and cancer may occur in the lungs at the same time. The number of such cases appears to be increasing. Several cases in which simultaneous tuberculosis and cancer of the lungs were diagnosed during life have been analyzed by Gerstl, Warring and Howlett.[1] They state that the cancer may escape detection because tuberculosis alone can cause the prominent symptoms and signs. Any failure to conform to the pattern of uncomplicated tuberculosis should lead to prompt investigation. In their cases x-ray evidence of major bronchial obstruction or of a relatively circumscribed solid mass led to more precise diagnostic procedures, such as bronchoscopy, biopsy of suspected metastatic lesions, study of cell blocks of sputum and pleural sediment and puncture biopsy. None of the cases described were considered operable, but the complete diagnosis resulted in a more definite prognosis and in better management. The best treatment requires a correct and complete diagnosis as early as possible. "Since pulmonary resection is now feasible in many cases of tuberculosis, the practical desirability of much earlier diagnosis of coexisting cancer is apparent. It is, perhaps, not too much to hope that diagnosis of cancer in an operative stage may occasionally be accomplished in spite of the added difficulty which exists when tuberculosis is also present."[1] Cancer should be suspected regularly in pulmonary tuberculosis in the older age group. The differentiation between certain tuberculous and cancerous pulmonary lesions, whether concurrent in the same case or unmixed, requires special efforts. Siltzbach[2] points out that mass chest surveys with x-rays may reveal unsuspected silent cancer of the lung, especially in the upper lobes of persons over 40. He reports 2 such cases treated for tuberculosis seven and sixteen months before the correct diagnosis was made.

1. Gerstl, Bruno; Warring, F. C., Jr., and Howlett, K. S., Jr.: Cancer and Pulmonary Tuberculosis: Diagnostic Problems in Patients with Cancer of Lung in the Presence of Pulmonary Tuberculosis, Am. Rev. Tuberc. **54**: 470 (Dec.) 1946.
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STATE OF VITAMIN A IN MILK

Both the food pigment carotene and vitamin A itself contribute to the vitamin A potency of milk fat. This potency is supplied to a considerable degree by carotene in the milk fat of the Jersey and Guernsey breeds,[1] whereas vitamin A itself is more important in this respect in the Holstein and Ayrshire breeds. A recent study[2] has described further the nature of the vitamin A in bovine milk and colostrum. This food factor, being an alcohol, can exist either free or esterified with a fatty acid. By chromatographic analysis it was shown that 98 per cent of the vitamin A in both colostrum and milk is in the esterified form in all of the breeds studied—Guernsey, Jersey, Holstein and Ayrshire. This is interesting in view of the fact that the major part of the vitamin A in the blood of the same cows was in the alcohol form. Whereas the chemical character of the vitamin A was identical in both colostrum and milk, the same study demonstrated that the yellow carotenoid pigment consisted more largely of carotene in colostrum (95 per cent) than in milk (89 per cent).

1. Baumann, C. A.; Steenbock, Harry; Beeson, W. M., and Rupel, I. W.: J. Biol. Chem. **105**: 167, 1934. Sutton, T. S., and Krauss, W. E.: Bull. Ohio Agric. Exper. Sta. **21**: 8, 1936.
2. Parrish, D. B.; Wise, G. H., and Hughes, J. S.: J. Biol. Chem. **167**: 673 (March) 1947.

THE MOTIVATIONS OF CUSTER'S LAST STAND

The ship *Swanton* arrived in New Orleans on Dec. 11, 1848 with some 280 steerage passengers, 16 of whom died of cholera during the passage. The packet boats plying the Mississippi River spread the infection with great rapidity to Memphis, St. Louis, Nashville, Wheeling and Pittsburgh. The epidemic subsided during the winter, to flare up in the spring in true epidemic form. This was the sequence for almost three decades. In 1867 cholera broke out at Fort Riley. George Armstrong Custer, at that time a young officer with a brilliant record, a major general at the age of 27, a lieutenant colonel in charge of a cavalry regiment on completion of the Union War, left his field of duty and returned to Fort Riley, having turned over the command of the regiment to the next senior officer. This was done without permission, because the young officer feared for the safety of Mrs. Custer, who then lived at Fort Riley. For this violation of the Articles of War, charges were preferred and court martial procedure was instituted. One year later Custer was charged with abandoning Major Elliott and his detachment while the latter was making a flanking attack under orders. The court martial convicted Custer and sentenced him to loss of rank and pay for one year. On the completion of his sentence Custer rejoined his regiment no longer the favorite of his superiors, no longer the "boy general." He was, in fact, a humiliated man, a victim of persecution, nurturing rancor in his heart and a desire to reestablish himself despite his petty persecutors. Dr. Paul R. Hawley[1] believes this desire to reestablish himself as a great military hero led to the final erratic conduct which culminated in the utter defeat by the Indians of Custer and his command and his own destruction. Menninger[2] says that Custer was psychopathologic, characterized by excessive vanity and disregard for the feelings or safety of others, a lack of loyalty either to cause or to friends, disregard of the principles of humanity or the established code of ethics, and at times a conspicuousness of achievement passing for success under circumstances in which ruthlessness and boldness are to some advantage. Menninger further points out that when such types were encountered among the enlisted men in World War II they were unceremoniously "boarded out on section VIII," which meant that they were dismissed from service because of inaptitude. In the case of officers of high rank this procedure could not be applied with the same ease and dispatch. This explains certain disastrous results, as far as the morale and even the lives of the men in charge of an incompetent leader are concerned.

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ORGANIZATION SECTION

Council on Medical Service

HEALTH CENTERS UNDER THE HOSPITAL CONSTRUCTION ACT

Prepared for the Council on Medical Service by Dr. Dean F. Smiley, Consultant in Health and Physical Fitness, Bureau of Health Education, American Medical Association
Chicago

The first health center in the United States was established in 1912 in Philadelphia as a child health center. Since 1912 health centers of various types have been rapidly developed, and it is estimated there are now at least 150 in operation.

As one would expect from the title, most health centers have been primarily concerned with health promotion. Other functions have, however, been combined with health promotion to produce not only public health centers but also health and welfare centers, health and recreation centers, hospital health centers and public health and medical service centers.

PUBLIC HEALTH CENTERS

Typical of the public health centers are the district health centers, district substations, child health stations, health centers with borough offices, health and teaching centers of New York, Boston, Baltimore and other large cities and the county public health centers of Missouri, Tennessee, Alabama and other states.

In these public health centers, facilities are provided for all or part of the following activities: communicable disease control and immunization services, sanitation services, maternal, infant and child hygiene services, public health laboratory service, vital statistics and health education.[1] Particularly stressed are the preventive medical services (examining and advising) and the health educational services.

In localities where the medical care of the indigent and medically indigent are an administrative responsibility of the public health department, ambulatory clinic facilities are sometimes provided as in Topeka, Kan.,[2] and certain counties in Missouri, as a part of the public health center. Even if this is the case, the functions of the health center are still primarily preventive rather than curative. In Topeka, Kan., the staff for the health center clinic is provided by the local medical society operating under a voluntary, prepaid medical care insurance scheme by which Shawnee County prepays the medical care of its indigent and medically indigent families at a flat rate of $4 a month per family.

HEALTH AND WELFARE CENTERS

About 1935 Los Angeles experimented with the idea of combining health and welfare functions in its health centers.[3] Under the leadership of Dr. John Pomeroy, Los Angeles County attempted to provide diagnosis and treatment of indigent outpatients in its health centers, the practicing physicians of the county donating their services in these centers. The welfare functions were however eventually abandoned, and these centers are now operating as public health centers.[4]

Examples of health and welfare centers operated by private agencies are found in the eight health centers operated in Monmouth County, N. J., by the Monmouth County Organization for Social Service, Incorporated. In the thirty-five years since its inception in 1911, this organization has grown until it now employs thirty-one public health nurses and supervisors and includes eight rural health centers, six lay auxiliaries and a social service exchange carrying nearly 60,000 case histories.[5]

Since welfare agencies serve only a limited clientele, while public health agencies are concerned with the health of all citizens, it is obvious that close association with welfare agencies would be apt to limit rather than enhance and expand the activities of the public health agencies.

HEALTH AND RECREATION CENTERS

In 1938 Dr. Frank K. Safford Jr. submitted three models which he had developed over the preceding four years. All were for health centers for preventive medicine, recreation and education;[6] the first for a large slum clearance housing project, the second for an American city of 100,000 population, the third for a city of 35,000 population.

The plan, in the words of the designer, would be as follows: "The recreation is designed to attract people to join the center as members, paying a yearly membership fee. Then membership privileges would include free use of athletic facilities, the service of the diagnostic clinic and reduced rates in the eating places, theater, medical baths and educational facilities. In the diagnostic clinic, members of the center would receive physical examination, including routine x-rays, urine and blood tests, periodic consultations, instruction in preventive medicine, including advice about exercise, recreation and diet. The medical work would be carried on by a visiting staff of physicians who would devote so many hours weekly in the center clinic just as they do in other hospital clinics, with the difference that in the center (supported by recreation and membership) they would be paid for their services. . . ."

As far as is known, none of these projected centers have as yet been built in the United States, though the Pioneer Health Center of this type in Peckham, London, has been in operation for years.

HOSPITAL HEALTH CENTERS

For the past ten years the W. K. Kellogg Foundation at Battle Creek, Mich., has been interested in developing hospitals in seven of Michigan's rural counties as rural hospital-health centers.[7] The units are primarily efficient rural hospitals, but they have been given the title of health center because they provide, in addition to hospital services, home maternity nursing service, complete home laboratory service and, in one center, home x-ray service. The laboratory and x-ray facilities of each hospital are made available at low cost to the practicing physicians of the surrounding area. Though public health offices have not yet been established in any of these hospitals, such a combination is contemplated, and in one of the experimental counties the county health officer is at the same time superintendent of the county hospital, the Branch County Community Health Center.[8]

A short description of the hospital health centers was published in 1940.[1b]

PUBLIC HEALTH AND MEDICAL SERVICE CENTERS

In 1946 there appeared at least three recommendations for the construction in rural communities too small to support a 50 bed general hospital of health centers to include a limited number of beds for medical, surgical and maternity cases. The first of

1. Typical plans for public health centers of this type have been published as follows: (*a*) Public Health Centers Architectural Records Building Types Study No. 67, Architectural Record, 119 W. 40th Street, New York 18, July 1942. (*b*) Health Centers: Building Types. Reference Study. Reprinted from the Building Types Section of the Architectural Record, 1940. (*c*) You Can Have One. What Are County Health Units? State of Missouri Division of Health, Jefferson City, Mo.

2. (*a*) Callahan, R. W.: Shawnee County Medical Service Plan for the Medically Indigent, J. M. Soc. County of New York, July 1943. (*b*) Survey of Some Major Health Facilities in Topeka City and Shawnee County, Kansas, May 1945. (*c*) Manual of Indigent Medical Care and Unit Fee Schedule, Shawnee County Medical Society, Topeka, Kan., June 1, 1946. (*d*) Unified Health and Welfare Centers.[3]

3. Unified Health and Welfare Centers of Los Angeles County, Calif., Architectural Record, June 1935, pp. 445-449.

4. Statement based on information given in personal conference with S. K. Cochems, executive secretary, Los Angeles County Medical Society, Feb. 17, 1947.

5. For Our County's Health and Welfare, Monmouth County Organization for Socias Service, Incorporated, 131 Pearl Street, Red Bank, N. J., 1946.

6. Safford, F. K., Jr.: Health Centers for Preventive Medicine, Recreation and Education: Design Trends, Architectural Record, February 1938.

7. There are ten of these hospitals in seven rural counties of Michigan as follows: Sheldon Memorial Hospital, Albion, Calhoun County; Allegan Health Center, Allegan, Allegan County; Haynes-Green County Memorial Hospital, Charlotte, Eaton County; Calhoun County Public Hospital, Battle Creek, Calhoun County; Community Health Center, Coldwater, Branch County; Pennock Hospital, Hastings, Barry County; Hillsdale Community Health Center, Hillsdale, Hillsdale County; Oaklawn Hospital, Marshall, Calhoun County; William Crispe Hospital, Plainwell, Allegan County; City Hospital, South Haven, Van Buren County.

8. Information gained in personal conference with Mr. Graham Davis, director, Division of Hospitals, W. K. Kellogg Foundation, Battle Creek, Mich., Feb. 22, 1947.

these recommendations [9] called for 5,500 to 6,000 square feet of floor space for the 10 bed hospital features, 2,000 square feet for the public health activities and 300 square feet for each private physician's and dentist's offices and examining rooms.

The second [10] and third [11] recommendations in almost identical words called for public health and medical service centers "in outpost areas at present without hospital facilities." The six functions of these centers would be:

1. To serve as the local point about which public and voluntary agencies can coordinate their efforts to conduct a program of health education.

2. To serve as the headquarters for the official public health agency with offices for health officer, sanitarian and public health nurses. To "be the base for programs in sanitation and preventive medicine, such as immunization against preventable diseases, the early diagnosis of tuberculosis, control and treatment of venereal diseases, and maternal and infant care activities."

3. To make provision for the conduct of routine laboratory tests and x-ray services. "It is contemplated that the physician himself or a nurse trained in the technics of the more commonly used diagnostic tests and examinations would operate these facilities. In some instances, trained technicians could be employed."

4. Provisions of office facilities for the physician or physicians who are residents in the community.

5. "The provision of a few beds and proper sterilization and delivery room facilities in the public health and medical service center for the care of normal obstetric cases would be highly desirable."

6. "Some effort should be made to provide temporary facilities for treating emergency cases until suitable arrangements can be completed for transfer of the patient to a general hospital with a thoroughly competent professional service. A definite working arrangement should be formulated for affiliation between public health and medical service centers and a conveniently located general hospital."

HEALTH CENTERS DEFINED BY GOVERNMENTAL AGENCIES

The Hospital Survey and Construction Act of 1946 [12] in section 631f states that "the term 'public health center' means a publicly owned facility for the provision of public health services including related facilities such as laboratories, clinics and administrative offices operated in connection with public health centers; . . ."

The Federal Register Document 47-1247;[13] filed Feb. 11, 1947, provides the following definitions as a part of the Public Health Service Regulations issued pursuant to the provisions of section 622 of the Public Health Service Act as amended by the Hospital Survey and Construction Act of 1946 (Public Law 725, 79th Congress):

Section 10.1 (p) *Public health center.* A publicly owned facility utilized by a local health unit for the provision of public health services, including related facilities such as laboratories, clinics and administrative offices operated in connection with public health centers.

Section 10.1 (q) *Local health unit.* A single county, city, county-city or local district health unit, as well as a state health district unit where the primary function of the state district unit is the direct provision of public health services to the population under its jurisdiction.

Section 10.1 (r) *Public health services.* Services provided through organized community effort in the endeavor to prevent disease, prolong life and maintain a high degree of physical and mental efficiency. In addition to the services which the community already provides as a matter of practice, the term shall include such additional services as the community from time to time may deem it desirable to provide.

TYPES OF HEALTH CENTERS TO BE CONSIDERED

Type 1 would offer five public health services only. It would be very simple and not house any full time staff. The facilities would be in use only when public health workers from the county unit were present or public health clinics were being conducted by local physicians temporarily employed by the health department.

Type 2 would offer the five public health services and in addition limited public health laboratory services and limited clinical laboratory services. The full time services of a medical technologist would probably be required. Reports of tests would be submitted to the patient's physician not to the patient.

Type 3 would offer the five public health services and the three diagnostic services, i. e. public health laboratory, clinical laboratory and x-ray laboratory services.[14a] It would require the full time services of a medical technologist trained also as an x-ray technician. Films and reports would be sent to the patient's physician, not to the patient.

Type 4 besides the five public health services and three diagnostic services would provide the practicing physicians of the community the use of office space close to the diagnostic facilities.

Type 5 would add emergency medical service and maternity service. This would require twenty-four hour service, 1 to 4 beds, kitchen and possibly laundry service.

Type 6 would add a 10 bed hospital with 5,500 or 6,000 square feet of floor space devoted to beds and adjunct services. Probably a minimum of 10 to 15 full time employees would be required for the hospital facilities alone.[9]

Type 7 would add offices for social and welfare workers and possibly clinic facilities for the medical and surgical care of the indigent.

Type 8 would add recreational facilities suited to the locality.[9]

COMMENTS

The most important needs to be met by the Hospital Survey and Construction Act in the order of their urgency would appear to be: (*a*) Community hospitals of 50 beds or more for rural communities of 20,000 or more. (*b*) Community clinics [14] of 10 or more beds for rural communities of 4,000 to 18,000. (*c*) Public health centers to serve as headquarters for single county or multicounty public health units. (*d*) Public health centers to serve as extensions of the single county or multicounty public health units into the smaller communities.

The need for public health centers to serve as extensions of the single county or multicounty public health units into communities of 4,000 to 18,000 is real but in my opinion not urgent. Acceptable space for this activity can frequently be rented and maintained at a cost much less than would be the case if a new building was erected.

The really difficult problem is undoubtedly establishing and operating the community clinics for the communities of less than 20,000. Hospital administration authorities are in apparent agreement as to the inefficiency of setting up full fledged hospital facilities with kitchen, laundries and laboratory, x-ray and physical medicine facilities for less than 50 beds. Difficult as it is, this problem would appear to offer better hope of effective attack if the primary objective of providing beds for the care of the sick in rural communities more than 30 miles from a general hospital is recognized and met head on. The plan of establishing such facilities under the title of public health and medical service centers is of doubtful wisdom for two reasons; first it confuses the issues, mixing the difficult and urgent problem of providing sick beds with the relatively simple and nonurgent problem of providing physical facilities for public health nurses and other workers; second, it complicates administration by mixing preventive medical activities which are under the administration of the local public health department with hospital and treatment activities neither of which is under the administration of the local public health department.

If recently trained physicians are to be attracted to such rural communities to begin their practice, there must be made available in the community not only clinical laboratory and x-ray service but twenty-four hour bedside nursing service as well. To obtain this latter service some type of cottage hospital or community clinic would appear to be essential.

9. McGibony, J. R., senior surgeon, Hospital Facilities Section, States Relations Division, U. S. Public Health Service: Health Center Designed for Rural Needs, Mod. Hosp., March 1946.

10. Commission on Hospital Care Technical Staff, Health Center Concept, Hospital Survey News Letter, 22 East Division Street, Chicago 10, April 1946.

11. Michigan Hospital Survey Committee: Hospital Resources and Needs: Report of the Michigan Hospital Survey, W. K. Kellogg Foundation, Battle Creek, Mich., 1946.

12. Public Law 725, 79th Congress, chapter 958, 2d session, S. 191: An act to amend the Public Health Service Act to authorize grants to the states for surveying their hospitals and public health centers and for planning construction of additional facilities, and to authorize grants to assist in such construction, approved Aug. 13, 1946. State Agencies Designated to Administer Hospital Program, Federal Security Agency, U. S. Public Health Service, Division of Hospital Facilities, Washington, D. C., Dec. 27, 1946.

13. Reprint from Federal Register, Division of Hospital Facilities, Title 42, Public Health, chapter 1, Public Health Service, Federal Security Agency (F. R. Doc. 47-1247; filed Feb. 11, 1947, 8: 54 a. m.).

14. It is suggested that small community hospitals of 10 to 40 beds offering a limited medical and maternity service but not including major surgery or specialty services, be given the term "community clinic." Plans and equipment for such units have been proposed in the following publications. Hospitals—Architectural Record's Building Types Study, Number 104, Architectural Record, August 1945. Equipment for a 10 Bed Hospital and Health Center, 41546, Federal Security Agency, U. S. Public Health Service Hospital Facilities Section. Kinde, M. R.: Diagnostic Facilities in Rural Areas, Hospitals, January 1943. Sarvis, L. J., and Davis, G. L.: South Haven Hospital: It Is Efficient and Expandable, Hospitals, September 1943.

I have no panacea to offer for this problem. I simply point out (*a*) that combining public health center activities with beds does not simplify in any way the problem of maintaining those beds in a small community, (*b*) 60 per cent occupancy of such rural beds would probably have to be considered reasonable utilization (there may be thirteen classifications of patients in a 30 bed hospital). (*c*) While McGibony [9] estimates the cost per patient at $9.40 a day in such a 10 bed hospital, Beelman and Steinmeyer [15] reported in 1945 that fifty-two Kansas hospitals averaging 12 beds each showed costs of only $4.99 a day per patient with an occupancy of 50 per cent. This problem is primarily a hospital administration problem, i. e. how to extend hospital facilities to communities of less than 20,000; the public health problem of extending public health services from the county or multicounty center to the smaller communities is only a minor and incidental part of this big problem.

Public health centers should limit their activities to the generally accepted public health program, adding on functions as the community by organized action places additional responsibilities (such for example as administering the provisions of ambulant medical care to the community's indigent population) on the health department.

Whether in base hospital service areas, intermediate hospital service areas or rural hospital service areas every effort should be made to place the public health headquarters as close as is practicable to the hospital (and the medical school if there is one).[16] Thus there will be developed eventually base medical centers, district medical centers and community medical centers, with the public health centers as one unit of the larger medical center.

In the base and intermediate hospital service areas the public health center had probably best be in a separate building close to the hospital (and medical school if there is one). In rural hospital service areas the public health center may well occupy space in the community hospital or in the community clinic, but the two projects should be kept administratively independent of each other.[16] All of these would be type 1 public health centers.

If a public health center is required in a rural community which does not have and does not need a community hospital or a community clinic, it is suggested that consideration be given to providing in such a center not only facilities for communicable disease control efforts, sanitation activities, maternal-infant-child hygiene measures, vital statistics, health education and public health laboratory service but also facilities for clinical laboratory service and limited x-ray service (type 2 or type 3 centers). If the local practitioners in the area desire office space in such a center in order to obtain easier access to the laboratory and x-ray facilities there should be no serious objection to that request, and a type 4 center should be established.

If means are developed for establishing community hospitals and community clinics where needed there would appear to be no need for public health centers of types 5 and 6.

In my judgment the advantages of combining welfare facilities or recreation facilities in the public health center would not be sufficient to outweigh the costs and administrative confusion resulting from such a combination, and I see no place for centers of types 7 and 8 under the terms of the Hospital Survey and Construction Act of 1946.

CONCLUSIONS

1. At least fourteen different functions have been assigned the health center since 1912.

2. Of these fourteen functions it is recommended that only five (communicable disease control efforts, sanitation, maternal-infant-child hygiene measures, vital statistics and health education) be generally included under the title of public health center as that title is used in the Hospital Survey and Construction Act of 1946.

3. It is recommended that public health centers be established as needed [17] and as close as is practicable to hospitals and medical schools (if any) in base hospital service areas, intermediate hospital service areas and rural hospital service areas and that they be integral parts of base medical centers, district medical centers and community medical centers. It is, however, recommended that at every level the public health center be kept administratively independent and that the differing needs of hospitals and public health centers for quiet and for accessibility be kept in mind.

4. Public health centers to serve as headquarters for county and multicounty public health units are much more urgently needed than are rural public health centers serving as extensions of county and multicounty public health units.

5. It is recommended that in rural communities of 4,000 to 18,000 in need of sick beds but not large enough to afford a 50 bed general hospital "community clinics" of 10 to 40 beds be provided by hospital authorities rather than "public health and medical service centers" provided by public health authorities. However, administratively independent public health centers may sometimes be advantageously housed in the community hospital or community clinic. Such community clinics should be so organized and administered that they will not infringe on the private practice of medicine by physicians.

6. In those rural communities where bed service is available from neighboring community hospitals and the urgent need is for facilities for public health and diagnostic facilities it is recommended that the public health center shall provide facilities not only for the traditional six point public health service but also for clinical laboratory service and limited x-ray service. Offices for the part time use of the practicing physicians of the community should also be included if the physicians so desire.

7. In the interests of economy and administrative efficiency it would appear generally wise to avoid combining medical service functions, hospitalization functions, welfare and social service functions or recreational functions with public health functions in the public health centers projected under the terms of the Hospital Survey and Construction Act of 1946. The public health center should, however, include facilities for meeting effectively any responsibility laid on the public health department by the local community.

15. Beelman and Steinmeyer: Kansas Government Journal, July 1945.

16. Dr. Haven Emerson has pointed out that while hospitals are best built where there is freedom from traffic noise, public health centers are most effective when most easily accessible to the public. This point is important and should not be ignored in the effort to centralize health and medical facilities.

17. The Hospital Survey and Construction Act of 1946 definitely limits the number of such centers in thickly populated states to one per 30,000 people; in states having a population of less than 12 persons per square mile to one per 20,000 people.

Woman's Auxiliary

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Following are the national officers, directors and chairmen of standing committees for 1947-1948 of the Woman's Auxiliary to the American Medical Association:

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Official Notes

STEPHEN GRAHAM CHANGES TIME

The A. M. A.-Mutual radio program Stephen Graham—Family Doctor will change time with its extension from July 28 to November 17.

Beginning July 27 the program will be heard at 2 p. m., Eastern daylight time, including the New York outlet WOR not heretofore available. In the Middle West the program will be on the air at 1 p. m. Central daylight time; in the Mountain areas at 12 noon, Mountain daylight time, and on the Pacific Coast 11 a. m., Pacific daylight time.

There are numerous advantages to this time change. There is a larger listening audience at 2 p. m. than at 10:30 p. m. in the populous Eastern areas. The Hooper Rating Organization will now be able to estimate our audience, whereas no Hooper ratings are taken after 10:30 p. m. Sunday is a fine radio listening day for millions of people who have leisure not available to them on other days.

A specific request is hereby made to county medical society officers in communities where Stephen Graham is broadcast. It is requested that they communicate with the radio station program director, asking him what telephone calls and other communications were received on the disappearance of Stephen Graham from the customary Monday evening time spot. Details of such happenings should be reported to the Bureau of Health Education, American Medical Association, Chicago 10. Such information is of great value to the Bureau and to the radio network.

Washington Letter

(From a Special Correspondent)

July 30, 1947.

Liquidate Maternity and Infant Care Program

The Emergency Maternity and Infant Care program is being closed off books of the United States Children's Bureau under the liquidation program ordered by Congress starting July 1 in appropriations for the new fiscal year. Care will be provided for all wives and infants now receiving care as well as those who were eligible as of June 30. A total of more than $124,900,000 has been allotted to the states to cover the cost of the program. Congress has appropriated another three million dollars for the two fiscal years 1947-1948 and 1948-1949 to cover liquidation costs. All of 1,421,000 cases were approved for care. International experts in child medical care and nutrition from twelve countries met here to give technical advice to the International Children's Emergency Fund of United Nations. The fund comprises assets made available by UNRRA and contributions by governments, to which Congress has authorized another 40 million dollars.

Dean's Committee Endorses Bradley's Policies

General Omar Bradley's handling of the Veterans Administration was endorsed by the Dean's Committee of Baltimore in its report on organization of professional staffs of the Veterans Administration Fort Howard and Perry Point hospitals. The chairman is Dr. H. Boyd Wylie, acting dean, University of Maryland Medical School, and members are Dr. Alan M. Chesney, dean, Johns Hopkins Medical School of Medicine and College of Physicians and Surgeons; Dr. Lewis P. Gundry and Dr. Harry C. Hull, Maryland University, and Dr. Alan C. Woods and Dr. Perrin H. Long, Johns Hopkins. The report said that "few of the members of the staffs of the University of Maryland or Johns Hopkins hospitals would be participating in the program were it not for the policies established by General Bradley." The report said that doctors enlisted for service because "it permits them to maintain a high type of medical care and treatment of veterans; it is relatively free from the stifling effects of 'red tape' and bureaucracy; it permits the doctors to practice under conditions comparable to those existing in the best civilian hospitals in Baltimore; it is free (or has been so far) from so-called politics."

Atomic Energy for Health Purposes

The Atomic Energy Commission has reported that it is trying to turn atomic energy into peacetime uses, particularly in the field of health and eventually for the use of atomic energy for power. A statement outlining development of atomic weapons added "An important beginning has been made at exploiting peacetime uses of atomic energy. Radioisotopes, a most promising research tool in chemistry, biology and medicine, and of great promise in agriculture and metallurgy, are being produced and distributed in ever increasing quantity. Shipments of radioisotopes to hospitals and other research institutions now exceed 100 per month. Heavy hydrogen, another isotope of particularly great use in many kinds of research, is available for the first time at low cost."

Higher Pay for Service Doctors

Representative Blackney, Michigan Republican, has submitted to Congress a bill to raise pay of armed forces and U. S. Public Health Service doctors. A medical officer's base salary would be increased $100 a month and specialists an additional 25 per cent. Mr. Blackney estimates costs of the legislation around $9,000,000 a year. The proposal was advanced to meet an "alarming" shortage of service doctors. The income of the average civilian doctor is more than double that of medical officers. Mr. Blackney cited testimony of General Eisenhower, Army chief of staff, that the present Army Medical Corps is sufficient to maintain an army of only 200,000 men, while the strength of the Army is now a million men. Navy medical needs are similarly acute.

Advocates Pelvic Examination for Wacs

Senator Byrd of Virginia has offered an amendment to pending legislation to incorporate the Woman's Army Corps into the Regular Army which would require pelvic examinations of Wacs by doctors, preferably women doctors and specialists in the field. The Army Medical Corps is reported to take the stand that annual or semiannual pelvic examination of women in the Army is unnecessary because out of 115,767 women in the Army during the second world war there were only 187 cancers, 55 involving the pelvic organs. It is contended that a pelvic cancer incidence of 55 per 115,000 might be reduced by more expert examination and early detection of cancer symptoms in young women entering the service.

Coming Medical Meetings

American Association of Medical Record Librarians, New York, Hotel Commodore, Sept. 7-12. Mrs. Adaline Hayden, 18 E. Division St., Chicago, Executive Secretary.

American Association of Obstetricians, Gynecologists and Abdominal Surgeons, Hot Springs, Va., The Homestead, Sept. 4-6. Dr. James R. Bloss, 418 Eleventh St., Huntington 1, W. Va., Secretary.

American College of Surgeons, New York, Waldorf-Astoria Hotel, Sept. 8-12. Dr. Paul B. Magnuson, 40 E. Erie St., Chicago 11, Secretary.

American Congress of Physical Medicine, Minneapolis, Hotel Radisson, Sept. 2-6. Dr. Richard Kovacs, 2 E. 88th St., New York 28, Secretary.

American Congress on Obstetrics and Gynecology, St. Louis, Municipal Auditorium, Sept. 8-12. Mr. Karl S. Richardson, 24 West Ohio St., Chicago, Business Manager.

American Roentgen Ray Society, Atlantic City, Sept. 16-19. Dr. H. Dabney Kerr, University Hospitals, Iowa City, Secretary.

Colorado State Medical Society, Denver, Shirley-Savoy Hotel, Sept. 17-20. Mr. Harvey T. Sethman, 1612 Tremont Place, Denver 2, Executive Secretary.

Michigan State Medical Society, Grand Rapids, Pantlind Hotel, Sept. 24-26. Dr. L. Fernald Foster, 2020 Olds Tower, Lansing 8, Secretary.

National Medical Association, Los Angeles, Aug. 18-22. Dr. John T. Givens, 1108 Church Street, Norfolk 10, Va., Secretary.

Nevada State Medical Association, Reno, Sept. 4-6. Dr. Moreton J. Thorpe, 17 N. Virginia St., Reno, Secretary.

Oregon State Medical Society, Portland, Sept. 4-6. Dr. Thomas S. Saunders, 1020 S. W. Taylor St., Portland 5, Secretary.

Pennsylvania, Medical Society of the State of, Pittsburgh, Hotel William Penn, Sept. 15-18. Dr. Walter F. Donaldson, 500 Penn Avenue, Pittsburgh 22, Secretary.

Southeastern Dermatological Association, Knoxville, Tenn., Hotel Andrew Johnson, Aug. 31. Dr. A. H. Lancaster, 608 W. Main Ave., Knoxville, Secretary.

Utah State Medical Association, Salt Lake City, Sept. 11-13. Dr. Ray T. Woolsey, 610 McIntyre Bldg., Salt Lake City 1, Secretary.

Western New York and Ontario Urological Society, Saranac, N. Y., Saranac Inn, Sept. 3-6. Dr. Albert M. Crance, 525 S. Main St., Geneva, N. Y., Secretary.

GOVERNMENT SERVICES

ARMY

SEEK FUNDS FOR BUST OF WALTER REED

The American Society of Tropical Medicine will sponsor the campaign to raise funds to provide a bust of the late Major Walter Reed of yellow fever fame to be placed in the Hall of Fame at New York University (THE JOURNAL, July 5, p. 909). The Surgeon General's Office will aid in the campaign. It is planned to collect the funds and have the sculpture completed so that it may be dedicated at the time of the International Congress for Tropical Medicine and Malaria, which will be held in Washington, D. C., next spring. Contributions are requested and should be sent to the secretary-treasurer, American Society of Tropical Medicine, National Institute of Health, Bethesda 14, Md. Walter Reed is the first member of the medical profession to be chosen for a place in the Hall of Fame for Great Americans on the campus of New York University. He is the seventy-seventh historical figure chosen for this honor.

MICROFILM COPIES OF MEDICAL LITERATURE

The Army Medical Library, Washington, D. C., has a collection of more than a million volumes that have been gathered, catalogued and indexed since 1836, a treasure of medical literature which goes back in some cases to medieval times. Physicians, libraries and professional workers may obtain facsimile replicas of this material on 35 millimeter film through the microfilm service of the library. Those requesting the material receive the film reproduction reduced to the size of a large postage stamp for each page, which can be read in small size film viewers which enlarge the microfilm or they can be projected to readable size in special machines available in many libraries. During 1946 more than six million pages of medical literature were distributed by the Army Medical Library on microfilm. Articles in medical periodicals are duplicated on microfilm for 50 cents each, and books for 50 cents for each fifty pages or fraction thereof.

LOW POSTWAR VENEREAL DISEASE RATE

The War Department has announced that the army venereal disease rate at home and abroad has reached a postwar low. Present incidence in Europe is 23 per cent below the July 1946 high, in the Pacific 50 per cent below the October 1946 high, and in the United States 47 per cent below the April 1946 high. The sharp drop is considered by the Army to have been brought about by the stringent regulations outlined by Secretary of War Patterson last January.

HOSPITAL AT MINOT, NORTH DAKOTA

The contract for the Veterans Administration hospital at Minot, which has been let by the Army Corps of Engineers, calls for a cost of $3,395,000 without the laundry and nurses' quarters and the elevators. Work on the hospital will start at once.

PERSONAL

Col. Roary A. Murchison, M. C., U. S. Army, executive officer at the U. S. Army Percy Jones Hospital, Battle Creek, Mich., has been ordered to duty in Hawaii. Colonel Murchison served in England and France during World War II.

ARMY AWARDS AND COMMENDATIONS

Colonel Myron P. Rudolph

The United States of America Typhus Commission Medal has been awarded to Col. Myron P. Rudolph, M. C., U. S. Army, the citation reading in part as follows: He distinguished himself by exceptionally meritorious service by assisting the work of the United States of America Typhus Commission in Germany during the period March 15 to June 1, 1945, by planning and supervising with conspicuous success the administration and carrying out of details for the control of a full blown typhus fever epidemic raging in the midst of thousands of concentration camp internees. He rendered invaluable service by organizing in the Dachau camps and in southern Bavaria medical units and agencies to bring the typhus epidemic under control. His outstanding contributions to this effort are deserving of the highest praise. Dr. Rudolph graduated from Hahnemann Medical College in 1915 and entered the military service Oct. 5, 1917.

Major David Sloane

The Army Commendation Ribbon has been awarded to Major David Sloane, M. C., A. U. S., now of Dayton, Ohio. The citation read in part as follows: Your service with the Medical Department has been exceptional when compared with others of the same grade or similar position, and I wish to commend you for your outstanding contribution as chief of the orthopedic section, Thomas M. England General Hospital, Atlantic City, N. J., from Feb. 3, 1946 to May 10, 1946. Dr. Sloane graduated from Columbia University College of Physicians and Surgeons, New York, in 1925 and entered the military service in August 1942.

Captain Jerome D. Solomon

The Legion of Merit has been awarded posthumously to Capt. Jerome D. Solomon, M. C., A. U. S., of Chicago. The citation read as follows: For exceptionally meritorious conduct in the performance of outstanding services at Sansapor, Dutch New Guinea, from Aug. 18 to Sept. 4, 1944. Captain Solomon, though convalescing from a serious illness, volunteered to accompany his unit when it was ordered to an operational area known to be infested with typhus. Immediately on arriving, his organization was ordered to construct a field hospital for typhus cases and began to receive patients at once. Despite his weakened condition he insisted on aiding in the construction of the hospital and subsequently took charge of the first ward of patients. Short of personnel, and by this time suffering from the fever himself, he entered on his duties as a medical officer, caring for the sick night and day. Finally his lowered resistance, brought about by his prolonged activity, forced him to become a patient. He later died of typhus fever. By his great devotion to duty in caring for his comrades at a time when the medical facilities were taxed to their utmost, and with the knowledge that he was endangering his own life, Captain Solomon performed outstanding service beyond the call of duty. Dr. Solomon graduated from the University of Illinois College of Medicine in 1941 and entered the military service in September 1942. As a memorial, his father has established the Dr. Jerome D. Solomon Memorial Research Foundation.

VETERANS ADMINISTRATION

RESIDENCY TRAINING PROGRAMS

Two new residency training programs for physicians desiring to train in neurology under the Veterans Administration have been organized. These residencies offer training toward certification in neurology by the American Board of Psychiatry and Neurology.

The first new program will be conducted under the auspices of the New York University and the neurologic service of the psychiatric division of the Bellevue Hospital, New York. The program provides for training at Bellevue Hospital and the Veterans Administration New York Regional Office. Applications should be sent to Dr. S. Bernard Wortis, Chairman, Deans Subcommittee for Neurology, New York University, 400 East Thirtieth Street, New York.

The second new program has been organized by the George Washington School of Medicine and the Georgetown University Medical School. Residents will be offered training facilities at the Gallinger Municipal Hospital and the VA Hospital, Washington, D. C., the VA Regional Office, Childrens Hospital, and the Army Institute of Pathology. Applications should be forwarded to Dr. Walter Freeman, Chairman, Deans Subcommittee for Neurology, 2014 R Street N.W., Washington, D. C.

Other medical schools affiliated with the Veterans Administration for residency training in neurology where training programs are already under way, are:

Medical School	VA Hospitals and Clinics	Applications Received by
Cornell University Columbia University	Bronx, N. Y. Hospital	Dean Willard C. Rappleye, 630 N. 168th Street New York
Northwestern Univ. University of Illinois	Hines, Ill. Hospital	Dr. Lewis J. Pollock, Northwestern University, Chicago
Univ. of Minnesota	Minneapolis	Dean Harold S. Diehl, University of Minnesota, Minneapolis 14
Boston University Tufts Medical College Harvard University	VA Hospital, Framingham, Mass.	Dr. Harry C. Solomon, Chairman, Deans Subcommittee for Neuropsychiatry Harvard Medical School, Boston
Jefferson University Medical College and Clinic		Dr. Edward A. Strecker, Chairman, Deans Subcommittee for Neuropsychiatry 111 North 49th Street, Philadelphia 39

EXHIBIT OF PROSTHETIC DEVICES

After more than a year's work in cooperation with the prosthetic appliances industry, which contributed most of the items at no expense to the government, a permanent exhibit of nearly a thousand items of prosthetic devices has been opened in the Veterans Administration building, Washington, D. C. Among the items on display are some three hundred and fifty different types of legs and arms, hearing aids, cosmetic hands, plastic eyes, wheel chairs, crutches, facial prosthetic devices, and wigs. The exhibit will enable prosthetic specialists in the Veterans Administration to make a critical analysis of the different features of the various aids and help veterans select the devices best suited to their needs. The exhibit should also aid in eliminating duplication of effort and research work in providing a central point at which inventors may learn what has already been developed in this field.

PATIENTS STUDY FROM TEXTBOOKS FLASHED ON CEILINGS

To patients flat on their backs for long periods such as those in tuberculosis hospitals and paraplegic centers, the Veterans Administration for the first time is bringing its educational program by flashing with special projectors microfilmed pages of textbooks on the ceilings over their beds. Thirty-two manuals have been microfilmed for the courses used in the Veterans Administration educational therapy program to launch this project. The subjects include English grammar, American government, physics, photography, refrigeration, radio for beginners, and books on the establishment and operation of small business. As patients complete the study of a page projected on the ceiling they turn the page by pressing a button on the projector to throw a new page on the ceiling. The special projectors were purchased by service organizations and similar groups throughout the country and were donated to the Veterans Administration without cost to the government. All Veterans Administration tuberculosis hospitals and paraplegic centers have several copies of each text film so that more than one veteran can study the same subject at the same time.

PERSONAL

Dr. Vernon C. Branham has been appointed assistant chief, outpatient section, Neuropsychiatry Division at the Central Office, Washington, D. C. Dr. Branham formerly was deputy commissioner of correction in New York, director of the New York State and City commissions for mental hygiene, and more recently director of the Woodbourne Institution for defective delinquents in New York.

PUBLIC HEALTH SERVICE

DR. MOUNTIN APPOINTED ASSISTANT SURGEON GENERAL

Dr. Joseph W. Mountin has been appointed associate chief, Bureau of States Services, U. S. Public Health Service, with the rank of assistant surgeon general, replacing Dr. Herman E. Hilleboe, who recently became health commissioner of New York. Dr. Mountin, who was formerly chief of the Division of States Relations in the Bureau of State Services, will be associate chief of the bureau and will continue to emphasize assistance to states for the development of full time local health departments. He joined the public health service in 1917 and in the last ten years has been in charge of several national divisions of the public health service, including the former Division of Public Health Methods, National Institute of Health and the former Division of Domestic Quarantine. He is a graduate of Marquette University School of Medicine, Milwaukee, and took part in the National Health Survey in 1935-1937, conducting the first mass study of hospital facilities in the United States.

RESEARCH FELLOWSHIPS

Under the research fellowship program of the U. S. Public Health Service, one hundred and sixty-one fellowships had been awarded to qualified scientists from 1945 when the program was inaugurated to May 6, 1947. The expansion of this program in the present fiscal year was made possible by increased Congressional appropriations for cancer, mental health and other research projects. The research fellowships advisory committee, composed of civilians, met at the National Institute of Health, Bethesda, Md., July 18, to advise the Surgeon General of plans to expand the research program.

PERSONAL

With the approval of Surgeon General Parran, Dr. R. C. Williams, Assistant Surgeon General, has been appointed a member of the board of directors of the Music Research Foundation, Inc., a nonprofit organization which has for its purpose the study of the use of music in the treatment of disease. Dr. Williams will act as chairman of the executive committee of the board of directors.

PHYSICIANS SEPARATED FROM SERVICE

ARMY MEDICAL CORPS OFFICERS RECOMMENDED FOR/OR RELIEVED FROM ACTIVE DUTY

California

Amyes, Edwin W.....Los Angeles
Anderson, Nels H.....San Fernando
Blum, John.....Berkeley
Bolton, Warren F.....Los Angeles
Dolhinow, Jack L.....Los Angeles
Eisenbeiss, John A.....Los Angeles
Egan, Albert R.....San Diego
Groth, George W.....Sierra Madre
Hanzlik, Harold.....Belmont
Larrabee, James F.....Beverly Hills
Miranda, Melvyn R.....Long Beach
Parker, Stanley G.....Campbell
Rydholm, Carl O.....Glendale
Sachs, Maurice D.....San Francisco
Shepherd, Ford.....Menlo Park
Turkel, Henry W.....San Francisco
Walsh, Joseph F.....Eureka

Connecticut

Bever, Christopher T.....Hartford
Boswell, Clay S.....West Hartford
Kummer, Jerome M.....Wallingford
Lenoci, Ralph J.....Bridgeport
Mariani, Ronald A.....New London
Moore, Maurice R.....Norwich
Rogawski, Alexander S.....Waterbury

Georgia

Burge, Charles D.....Atlanta
Elder, John D.....Winder
Franklin, Benjamin .....Atlanta
Lemon, Luther J.....McDonough
Matthews, William A.....Atlanta
Miracola, Charles C.....Augusta
Parks, Joseph W. Jr.....Newman
Sirmons, Derrel C.....Dahlonega
Wasden, Howell A. Jr.....Millen

Illinois

Atlas, Gerald D.....Chicago
Bigelow, Robert R.....Chicago
Billings, James H.....Chicago
Burianek, John F.....Berwyn
Cassel, William J. Jr.....Chicago
Drell, Hyman J.....Chicago
Eissler, Rolf.....Chicago
Epperson, Eugene B. Jr...Mount Vernon
Hasewinkel, Carroll W.....Marshall
Hauch, Edward W.....Chicago
Kudzma, Anthony J.....Cicero
Mitchell, George T.....Marshall
Mitchell, Hollard C.....La Grange Park
Potter, Thomas P. Jr.....Chicago
Reiss, George I.....Chicago
Turnbull, Theodore.....Neponset
Vynalek, William J.....Riverside
Wallner, Linden J.....Skokie

Indiana

Donham, William L.....Bicknell
Chattin, Robert N.....Union City
Greist, John H.....Indianapolis
Henry, Howard J.....Knox
Larmore, Joseph L.....Muncie
Moore, Harold T.....Indianapolis
Walters, Charles E.....Indianapolis

Iowa

Bennett, Chester G.....Iowa City
Beyer, George D.....New London
Gehling, Victor H.....Calmar
Hill, Thomas L.....Des Moines
Simmons, Abbott P.....Knoxville
Tracy, Harold L.....Cedar Rapids

Maryland

Beale, Henry D.....Chevy Chase
Brown, Thomas M.....Baltimore
Hamill, James E.....Bethesda
Milloff, Bernard.....Silver Spring
Supik, William J.....Baltimore

Massachusetts

Berry, Frank D.....Milford
Blacklow, Daniel J.....Dorchester
Dixson, Ira.....Stockbridge
Hagan, Cornelius E. Jr.....Fall River
Kavalgian, Aram.....Watertown
Larcom, Rodney C. Jr.....Deham
Moore, Carlton W.....Georgetown
Parker, William.....Dorchester
Sylvester, Rowland E.....W. Somerville
Tessier, Roland N.....Springfield
Wadsworth, Richard C.....Waltham

Michigan

Adamian, Gerald.....Detroit
Bailey, Robert S.....East Lansing
Dolfin, Wilbur E.....Wayland
Haarer, John G.....Grosse Ile
Linkner, Leonard S.....Detroit
McIntyre, Kenneth E.....Detroit
Martin, Robert G.....Detroit
O'Sullivan, Girardin S.....Flint
Parker, Willard.....Ann Arbor
Rutzen, Arthur C.....Detroit
Wanless, Loren E.....Detroit
Yates, Arthur J. W.....Detroit

Minnesota

Barr, Maxwell M.....Minneapolis
Bixler, Louis C.....Minneapolis
Johnson, Reinald G.....Minneapolis
Logan, Archibald H. Jr.....Rochester
Maguire, Leo M.....Minneapolis
Satory, John J.....Wabasha
Schmitz, Glenn P.....Melrose

Missouri

Daake, John W.....St. Louis
Donley, Leo F. Jr.....St. Louis
Eckert, Clarence T.....University City
Good, William O.....Kansas City
Haffner, Heinz E.....St. Louis
Kinsella, Ralph A. Jr.....St. Louis
Marshall, Homer C. Jr.....St. Louis
Stricker, Harold C.....St. Louis
Twente, George E.....St. Louis

New Jersey

Borrus, Joseph G.....Newark
Brown, Angus M.....Newark
Campo, Salvatore T.....Westville
Dunbar, Howard S.....Roselle Park
Feinberg, David D.....Bayonne
Krudener, Robert D.....Cliffside Park
Leonard, Justin T.....Skillman
Moran, Frank T.....Jersey City
Wagner, Richard.....Elizabeth

New York

Aey, Arthur E.....Dunkirk
Allende, Manuel F.....New York
Barber, Hugh.....Richmond Hill, L. I.
Corcoran, James.....Central Islip
Deutsch, Irvin.....Pearl River
Dexter, Fred E. Jr.....Narrowsburg
Diamond, Howard P.....Forest Hills
Feinberg, Samuel.....Port Jefferson
Grey, Stephen J.....Schenectady
Hunter, Leland H.....New York
Jacobi, Martin H.....Norwich
Kurtz, Kenneth A.....Syracuse
Lapinsky, Herbert.....Brooklyn
Lockwood, Howard.....Brooklyn
Moore, Samuel W.....New York
Phillips, Roswell W.....New York
Rausch, Carlton C.....Buffalo
Rothschild, Carl E.....Brooklyn
Rubin, Joseph D.....New York
Schwartz, Morris S.....Richmond Hill
Shapiro, Edward.....Brooklyn
Stein, Joseph.....Hawthorne
Wald, Milton A.....Brooklyn

Ohio

Buchert, Charles H.....Cincinnati
Burney, Thomas E.....Portsmouth
Cahill, Robert C.....Columbus
Gray, William B.....Dayton
Hawkins, Benjamin L.....Cincinnati
Nickerson, Neil D.....Cleveland
Paul, Louis P.....Lakewood
Schwartz, Harold.....Cleveland
Slatmyer, Karel R. Jr.....Elyria
Tille, Raymond J. Jr.....Mount Vernon
Urankar, Albin F.....Euclid
Woliver, Edward.....Cincinnati

Pennsylvania

Blomain, Emile W. Jr.....Archbald
Brown, Manson F.....Franklin
Cutler, Paul.....Philadelphia
Della, Anthony V.....Philadelphia
Eichman, Joseph C.....Bala Cynwyd
Garofalo, Carl A.....East Millsboro
Hauger, Harold N.....North Braddock
Keck, William S.....Mount Pleasant
Sonis, Meyer.....Philadelphia
Underwood, Grant.....Richeyville
Wallace, Clarence M.....Hummelstown

South Dakota

Geppert, Joseph W.....Vermillion
Giese, Douglas H.....Mitchell
Reinoehl, Warren L.....Winner

Texas

Althaus, John W. A.....Fort Worth
Brown, Jesse B.....Belton
Donovan, Thomas J.....Houston
Etier, Edgar L. Jr.....Fort Worth
Rothschild, Joseph E.....Dallas
Salmeron, Pedro Jr.....Houston
Springall, Francis S.....Dallas
Wade, T. W.....Kilgore

Utah

Brockbank, Mark J.....Price
Brown, John Z. Jr.....Salt Lake City
Olsen, Don D.....Ogden
Sanders, Myrle S.....Salt Lake City
Smith, Donald E.....Salt Lake City

Virginia

Berkeley, Alfred R. Jr.....Roanoke
Carter, George B.....Purcellville
Lechausse, Ralph M.....Pardee
Newbold, Herbert L. Jr...Newport News
Salasky, Milton.....Norfolk

Washington

Casey, James M.....Wenatchee
Drischel, Frank G.....Spokane
Kelley, Floyd C.....Seattle
Mering, Thomas W.....Spokane
Spendlove, Joseph G.....Seattle

West Virginia

Di Cello, Anthony J.....Elkins
Giglia, Tony R. Jr.....Glen Jean
Hartman, Ira F.....Buckhannon
Margolis, Lester H.....Montgomery
Schafer, Earl W. Jr.....Elm Grove

Wisconsin

Becker, Dean B. Jr.....Fort Atkinson
Dittmer, Otto A. Jr.....Milwaukee
Robinson, Thomas N.....Milwaukee
Simonds, Hamilton P.....Campbellsport

Puerto Rico

Alvarez, Jose A.....Arroyo
Alvarez, Luis Jr.....Santurce
Ferralioli, Cosme J.....Santurce
Mendez, Nicolas.....Camuy

Medical News

(Physicians will confer a favor by sending for this department items of news of general interest: such as relate to society activities, new hospitals, education and public health. Programs should be received at least two weeks before the date of meeting.)

ALABAMA

A New Ophthalmic Hospital.—Dr. Charles A. Thigpen, Montgomery, has presented to the Medical College of Alabama, Birmingham, $10,000 to be used to convert one floor in the Jefferson Hospital into an ophthalmic hospital, with operating rooms, museum, conference rooms and beds for patients. The gift is in memory of his nephew Dr. Job T. Cater, who was associated with him in practice until his death in 1940.

CALIFORNIA

Narcotic Violation.—Dr. Albert Peterson, 998 Page Street, San Francisco, pleaded guilty in the United States District Court at San Francisco to violation of the Federal Narcotic Law and on May 19 was sentenced to a term of five years.

Alameda County Blood Bank.—The Blood Bank of the Alameda County Medical Association has assumed full responsibility for the replacement of blood withdrawals. More than 700 pints is withdrawn each month. To maintain blood reserves, business, industrial, labor and club groups have been asked to establish blood credit plans. These plans are advance blood deposits on which group members may draw without posting a $25 replacement deposit. The objective of the plan is to maintain minimum monthly quotas for each group. Arrangements have been made with the American Womens Voluntary Services to provide free delivery for the blood. The board of directors asks each doctor to accept his share of community responsibility in seeing that his patients replace blood that he has withdrawn for them.

Personals.—Dr. Clesson Richardson and his wife, both San Francisco physicians, have left for Korea on the army hospital ship *Hope* to take charge of a general hospital for the Salvation Army at Yong Dong, 150 miles from Seoul. The Richardsons are the first Salvation Army representatives to be assigned to work in the Orient since the war. They went to Korea in 1940 to open this same hospital but returned because of Japanese opposition.——Dr. Leo Eloesser, San Francisco, formerly professor of clinical surgery at Stanford University School of Medicine, San Francisco, is returning to China on behalf of the World Health Organization Interim Commission. Dr. Eloesser was assigned as teaching specialist in surgery for the Chinese medical training program of the UNRRA in 1945 (THE JOURNAL, Sept. 29, 1945, p. 1049).

Postgraduate Courses for Practitioners.—Stanford University School of Medicine, San Francisco, in cooperation with the San Francisco Department of Public Health and the San Francisco Hospital, will hold postgraduate medical courses for practicing physicians September 8-12. Registration closes August 16. Morning courses will be on the subject of oncology, internal medicine, fractures and orthopedic problems and general problems in pediatrics. The afternoon courses will be on the subject of general surgery, general problems in surgical specialties, management of diabetes and obesity, and neurology and psychiatry. A course in anesthesiology, limited to eight physicians whose practice already includes anesthesiology, will also be offered. Subjects for evening meetings are body fluids and their replacement, chemotherapy and antibiotics, and hematology. The registration fee is $50.

COLORADO

Short Course in Chest Diseases.—A two week postgraduate course in chronic chest diseases, presented by the American Trudeau Society and the University of Colorado School of Medicine, began July 28 at the Colorado Medical Center, Denver, with special emphasis on tuberculosis. Thirty-five physicians from twelve states are enrolled. The instructors are members of the school of medicine faculty, three physicians from the Denver County Medical Society and nine visiting faculty members.

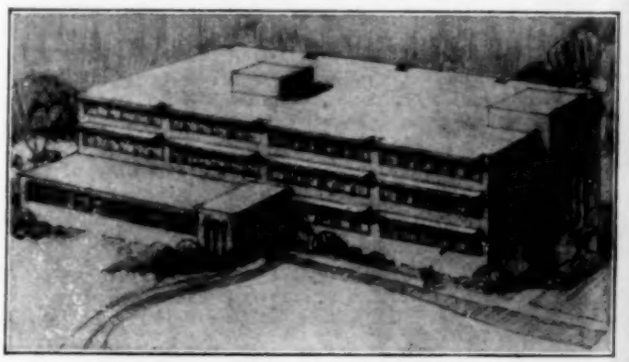
CONNECTICUT

Home Town Medical Care.—The contract between the Connecticut State Medical Society and the Veterans Administration to provide home town medical care for the state's war veterans has been renewed for one year. It has also been announced by the Veterans Administrations that its contract with the Connecticut Pharmaceutical Association has been renewed for the same period.

Rural Medical Service.—A recent poll of opinions from the general public conducted by the Connecticut State Medical Society's Committee on Rural Medical Service indicates that rural residents desire more medical specialists in the smaller towns, more hospital beds and the extension of hospital care plans. Other opinions thus expressed, according to Dr. Creighton Barker, secretary of the state medical society, comprise a general feeling among rural residents that the costs of medical care, although high, have not outrun other necessary costs of living, and an expression favoring the coordination of the home nursing services of various agencies. The report was made before 125 representatives of civic, farm and health agencies who attended Connecticut's first rural health conference July 16 at the University of Connecticut, New Haven.

ILLINOIS

Tuberculosis Research Center to Supply BCG Vaccine.—Governor Green has signed a bill authorizing the construction and maintenance of a tuberculosis research hospital in conjunction with the University of Illinois College of Medicine, Chicago. It includes an appropriation of $361,250. The Institute for Tuberculosis Prevention, which will be built on the medical campus and be run in close cooperation with the City of Chicago Municipal Tuberculosis Sanitarium, will supply



Architect's drawing of the institute.

BCG vaccine for the U. S. Public Health Service, now carrying on a project in Columbus, Ga., for a long range study of the vaccine. The vaccine, which can now be manufactured at a cost of about half a cent per dose, will be distributed to regular health agencies, city, state and federal, but not on commercial lines. The Research Foundation board headed by Park Livingston, president of the trustees of the University of Illinois College of Medicine, Chicago, has been set up to raise additional funds for operation of the institute. Among those associated with him are Dr. Walter H. Theobald, head of the mayor's medical center commission; Dr. Ernest E. Irons, Rush professor of medicine (emeritus); Dr. Robert Black, head of the department of pediatrics at Loyola University; Dr. Alexander A. Day, head of the department of bacteriology at Northwestern University, and Dr. Michael F. McGuire, clinical professor of surgery at Loyola University School of Medicine.

Chicago

Coeducational School for Nurses.—Mount Sinai Hospital will conduct a coeducational school for nurses accredited by the Illinois State Department of Registration, beginning September 3. All applications should be in the registrar's office one month prior to this date. Last January 1 the hospital opened its new Nurses and Educational Building, which cost $825,000 to construct and $100,000 to equip.

Dr. Tom Spies to Head New Department.—Northwestern University and the Spies Committee for Clinical Research will establish in Chicago a center for medical research in the field of nutrition and metabolism. The agreement provides that Dr. Tom D. Spies, associate professor of medicine at the University of Cincinnati, will become professor of nutrition and metabolism and chairman of a new department in this field in the Medical School of Northwestern University. Following his resignation

from the University of Cincinnati he will assume his new duties September 1, at which time the Spies Committee will sever its relationship with the University of Cincinnati. The agreement further provides that the committee will grant to the university at least $150,000 annually for five years to be used for the expenses of this department and for research carried on under Dr. Spies. The committee will shortly embark on a program to raise funds to house and endow the new department. The Spies Committee for Clinical Research was organized in 1943. Dr. Spies in 1937 organized, and has since directed, the University of Cincinnati studies in nutrition at the Hillman Hospital nutrition clinic, Birmingham, Ala., and this work will continue under his direction.

INDIANA

Dr. Zeller Appointed Director of Mental Health.—Dr. Charles A. Zeller, Lansing, Mich., began duties August 1 as director of the Indiana Council for Mental Health and superintendent of the Madison State Hospital, North Madison, succeeding Dr. Clifford L. Williams, resigned. Dr. Zeller, a graduate of the University of Buffalo School of Medicine, 1927, has served with state mental hospitals in Pennsylvania. In 1946 he was appointed director, Michigan Department of Mental Health.

KENTUCKY

Memorial to Dr. Owen.—Plans for a convalescent home for crippled children were announced early in June as a memorial to Dr. W. Barnett Owen, professor of orthopedic surgery at the University of Louisville School of Medicine, who died February 23. Dr. Irvin Abell, professor emeritus of the School of Medicine, is chairman of the W. Barnett Owen Committee, which hopes to raise $150,000 to cover the cost of the home to be built on the grounds of the Kosair Crippled Children's Hospital in Louisville.

State Program for Handicapped Persons. — Practicing physicians and county health units have received letters from the division of special education of the department of education in Frankfort asking aid in administering the state program for physically and mentally handicapped persons. Funds are provided for surgery, hospitalization, medical treatment, purchases of artificial appliances and payment for employment training of persons who qualify for assistance. They must be over 16 years of age and have such impairments as blindness, deafness, cardiac disability, arrested tuberculosis or any crippled condition or physical abnormality constituting an employment handicap.

LOUISIANA

Personal.—Ralph E. Brauer, Ph.D., formerly on the faculty of Harvard Medical School, Boston, joined the faculty of the Louisiana State University School of Medicine, New Orleans, July 1, as assistant professor of pharmacology. He has received a grant of $5,000 from the National Institute of Health for research on the effect of liver injury on plasma proteins.

Cerebral Palsy Center.—The Orleans Unit of the Louisiana Society for Crippled Children has established a cerebral palsy center on the grounds of L'Union Francaise under the approval of the Orleans Parish Medical Society. It will be operated for the time being twice a month on the second and fourth Saturdays from 9 to 1 o'clock. The purpose of the center is to furnish instructions to the parents and guardians of spastic children in their care at home. No diagnosis or treatment will be given, nor will there be interference of duplication of treatment received by the children at clinics or from their private physicians. Dr. H. Theodore Simon is the medical adviser and Dr. Lyon K. Loomis the orthopedist.

MASSACHUSETTS

Appoint Professor of Preventive Medicine.—Dr. David D. Rutstein, New York, has been appointed professor of preventive medicine at Harvard Medical School, Boston, succeeding Dr. John E. Gordon, who since July 1, 1946, has been head of the department of epidemiology in the school of public health. Dr. Rutstein, a graduate of Harvard Medical School, 1930, served in the New York State Department of Health, first as a consultant in pneumonia and then as chief of the cardiac bureau. He has been an assistant professor of medicine at Albany Medical College and, on leave, an instructor in medicine at Columbia University College of Physicians and Surgeons, New York. During the war he was national director of the Gas Protection Section of the Office of Civilian Defense and was deputy commissioner of health for the New York City Health Department. Since 1946 he has been medical director of the American Heart Association and the American Council on Rheumatic Fever and a consultant to the Joint Research and Development Board of the departments of War and Navy.

MICHIGAN

Psychiatric Research Project.—The National Committee for Mental Hygiene, the Federal Office of Vocational Rehabilitation and the Michigan State Board of Control for Vocational Education will conduct a psychiatric research project in Wayne County. The staff, including a psychiatrist, clinical psychologist, psychiatric social work consultant, five psychiatric social workers and four clerks, will begin the project this fall under the supervision of the state rehabilitation division and the national committee. The results will be of value to science as well as to the future rehabilitation program for the mentally disabled.

Tuberculosis in Michigan.—Figures released by the state department of health show that tuberculosis took the lives of nearly twice as many men as women in Michigan in 1946. Male deaths due to tuberculosis numbered 1,214 and female deaths 629. More than 45 per cent of tuberculosis deaths among women occurred under 30 years of age, while 49 per cent of tuberculosis deaths among males occurred over 50 years of age. The Michigan trend is similar to national figures in this regard. The greatest number of female deaths were between the ages of 20 and 30, and the greatest number of male deaths over 60. Of the total of 1,843 deaths attributable to tuberculosis, 64 were of children under 5 years of age and 20 of these were children under 1 year. The death rate due to tuberculosis is 33.4 per hundred thousand of population and does not vary greatly from the previous five year average of 32.6 per hundred thousand.

MINNESOTA

Father and Five Sons Open Clinic.—Dr. William F. C. Heise, Winona, with his five sons, all physicians, opened a clinic in Winona July 7, where he has been practicing since 1898. The oldest son, Herbert, a graduate of Jefferson Medical College, Philadelphia, specializes in surgery. Dr. William, a graduate of Northwestern University Medical School, Chicago, is a pediatrician. Dr. Phillip, a graduate of the University of Arkansas School of Medicine, Little Rock, now a resident in obstetrics and gynecology, will join the staff in November. Dr. Paul, a graduate of Marquette University School of Medicine, Milwaukee, specializes in pathology and surgery. The fifth son, Dr. Carl, a graduate of Jefferson Medical College, was a resident physician on the eye, ear, nose and throat service at St. Luke's Hospital, Chicago. Winona has a population of about 22,490.

MISSISSIPPI

Deadline Near for Medical Scholarships.—August 15 is the deadline for receipt of applications for scholarship loan grants to become effective in September and October, and August 20 is the deadline for receipt of all credentials for applications filed by or before August 15 with the State Medical Education Board. At its last few meetings the board approved 13 more scholarship loans effective during the summer and fall of 1947, making a total of 73 loans approved to date. These 73 students who are preparing to return as general practitioners to rural areas in Mississippi will attend thirteen medical schools throughout the nation. Among these are seven women and eight Negroes. Forty-two of the students are veterans of World War II.

NEW YORK

Postgraduate Instruction.—The Medical Society of the State of New York and the New York State Department of Health have arranged two postgraduate lectures, one for Suffolk County Medical Society at Irving House, Southampton, Long Island, for July 30. Dr. James W. Hinton, associate clinical professor of surgery, Columbia University College of Physicians and Surgeons, spoke on "The Surgical Treatment of Hypertension." Postgraduate instruction for the Cayuga County Medical Society will be given at the Osborne Hotel, Auburn, September 18 at 8:30 p. m. William F. Bale, Ph.D., associate professor of radiology, University of Rochester School of Medicine and Dentistry, will speak on "Medical Aspects and Hazards of Controlled Nuclear Energy."

New York City

Two New Directors of Services. — Dr. A. Benson Cannon, professor of dermatology at Columbia University College of Physicians and Surgeons, began serving July 3 as director of the dermatology service at Presbyterian Hospital, succeeding Dr. J. Gardner Hopkins. Dr. Cannon was acting director of the dermatology clinic at the hospital from 1942 to 1946. Dr. Edmund P. Fowler Jr. succeeds Dr. John D. Kernan as professor of otolaryngology and director of the ear, nose and throat service at the Columbia-Presbyterian Medical Center. He took his medical degree at Columbia University College of Physicians and Surgeons, New York, 1930, and has been

assistant attending otolaryngologist at Presbyterian Hospital since 1938. During the late war his work in aviation medicine and studies of diseases of the ear in military personnel won him the Legion of Merit award.

Affiliation with Institute for Rehabilitation Program.—The affiliation between Columbia University College of Physicians and Surgeons and the Institute for the Crippled and Disabled to develop a program of rehabilitation and reeducation of the disabled was announced July 7. The new agreement will provide a means for training physicians, technicians, nurses, psychologists, social workers, vocational councilors, educators and those of other related professions. The institute will continue its independent existence. Cooperation with community groups, universities, medical schools, hospitals and institutions in addition to Columbia will be continued and encouraged. Columbia will nominate the medical board of the institute. Dr. Frank E. Stinchfield, associate in surgery at Columbia, will head the institute's medical services as orthopedic surgeon in charge. Two assistant medical directors and a staff of medical consultants will be named to conduct the expanded medical program of the institute.

Appoint Dr. Sulzberger Director of Department.—Dr. Marion B. Sulzberger, assistant clinical professor of dermatology and syphilology, New York Postgraduate Medical School and Hospital at Columbia University, has been appointed professor of clinical dermatology and syphilology of the New York Postgraduate Medical School and director of the department of dermatology and syphilology of the New York Skin and Cancer Unit. He succeeds Dr. George M. MacKee, who is retiring and has been made professor emeritus of the medical school. Dr. Sulzberger received his medical degree from the University of Zurich in Switzerland in 1926. He was on the staff of the Dermatology Clinic at the University of Switzerland and the University Clinic of Breslau, Germany. He was an assistant attending physician at the New York Postgraduate Hospital as well as on the staff of the New York Skin and Cancer Hospital and a research associate in medicine at Columbia University. He has served on the board for the Society of Investigative Dermatology since 1937.

PENNSYLVANIA

Academy of Physical Medicine.—At the regular monthly meeting of the Pennsylvania Academy of Physical Medicine in Philadelphia, June 19, a symposium on backache was presented by three Philadelphia physicians, Drs. Henry T. Tumen on the medical aspects, Michael Scott on the neurosurgical aspect and Abraham M. Rechtman on the orthopedic aspect. Officers elected for the ensuing year are Drs. Harold Lefkoe, Philadelphia, president; William Schmidt, Philadelphia, vice president; Herman L. Rudolph, Reading, secretary and John H. Hennemuth, Emmaus, treasurer.

Philadelphia

New Head of Ophthalmology Department.—Dr. Glen G. Gibson, Philadelphia, has been appointed professor and head of the department of ophthalmology at the Temple University School of Medicine and Hospital, succeeding Dr. Walter I. Lillie, who died February 21. Dr. Gibson, a graduate of St. Louis University School of Medicine, St. Louis, in 1930, has been an associate professor of ophthalmology at Temple University School of Medicine. He interned at Providence Hospital, Detroit, and was a fellow in ophthalmology at the Mayo Clinic, Rochester, Minn., 1931-1934.

Second Epidemic Among Infants.—For the second time in six months the maternity ward of the Philadelphia General Hospital has been closed to new patients because of an outbreak of gastroenteritis which has caused two deaths. The decision to close the ward was taken at a conference between Bernard Segal, inspector of the bureau of communicable diseases of the city health department, and physicians at the hospital. Dr. Rufus S. Reeves, city director of public health, said that gastroenteritis appeared in the infant ward on June 23. Earlier this year 27 babies died in eastern New Jersey and Pennsylvania, with most of the cases originating in Allentown, Pa. (THE JOURNAL, May 17, p. 307).

Begin Construction of Cancer Research Laboratory.—The Institute for Cancer Research, Inc., Philadelphia, broke ground early in June for the construction of a laboratory costing more than $1,000,000 at Fox Chase. Ground for the institute, which was formed three years ago, is being provided by Jeanes Hospital for a period of ninety-nine years. The hospital will cooperate with the institute technically. Funds will be donated by J. Howard Pew, J. N. Pew, Miss Ethel Pew and Mrs. Mabel Pew Myrin. The main laboratory will house 100 research workers in its three stories and basement. The Lankenau Research Institute building will continue to be used by the Institute for Cancer Research when its new building is completed in about a year. The Institute for Cancer Research, Inc., while a separate legal corporation, will continue with the staff of Lankenau Research Institute, which has been engaged in cancer research and associated diseases for more than twenty-five years. Dr. Stanley P. Reimann will continue as its director.

TEXAS

Gift to Rehabilitation Clinic.—In recognition of the work of the staff of the John Sealy Hospital, Galveston, in connection with the Texas City disaster victims, the Monsanto Chemical Company of St. Louis has given a grant of $25,000 to assist in the development of a Rehabilitation Clinic at the University of Texas Medical Branch, Galveston. Other industrial concerns in the Texas City-Galveston area are also assisting in the development of the project. The clinic will be developed in accordance with the recommendations of the Baruch Committee for Physical Medicine and will involve the services of orthopedic surgery, neurosurgery, plastic surgery, physical and occupational therapy, psychologic guidance, social readjustment and job placement.

Dr. Rigdon to Head Laboratory.—Dr. Raymond H. Rigdon, professor of pathology at the University of Arkansas Medical School, has accepted appointment as professor and director of the laboratory of experimental pathology at the University of Texas Medical Branch, Galveston. Dr. Rigdon received his M.D. degree from Emory University School of Medicine, Atlanta, Ga., 1931. Following a residency in pathology at Duke University School of Medicine, Durham, N. C., he became assistant professor of pathology at Vanderbilt Hospital, Nashville, Tenn. He was an associate professor of pathology at the University of Tennessee, 1939-1944, before going to the University of Arkansas. Dr. Rigdon is chairman of the southwestern section of the Society for Experimental Biology and Medicine.

WEST VIRGINIA

Care of Poliomyelitis Patients.—A training program designed to provide improved service for poliomyelitis patients in hospitals has been instituted by the Kanawha County chapter of the National Foundation for Infantile Paralysis. Several poliomyelitis emergency volunteers have completed a theoretical course and are now receiving bedside training at the Marmet Hospital, Marmet, and at Morris Memorial Hospital for Crippled Children at Milton. They will assist doctors, nurses and physical therapists in the care of patients. The program in Kanawha County is under the direction of Mrs. Fred Sarles, Charleston, the National Foundation's assistant director of women's activities in West Virginia. Instructions are being given by physicians active in the program.

Dr. Rossman to Head Bureau of Mental Health.—Dr. William B. Rossman, Charleston, has been appointed director of the new bureau of mental health of the state department of health. Plans for the new bureau were completed by the Public Health Council at a meeting in Charleston June 30. The establishment of mental clinics in various parts of the state is part of the program being planned. No appropriation was made by the legislature, but one third of the expenses will be paid from the state health department's general fund and the remainder will be provided by the federal government under provisions of the national mental health act passed by Congress in July 1946. Dr. Rossman, a graduate of Indiana University School of Medicine, Bloomington-Indianapolis, 1938, served in the ETO for two years as a neuropsychiatrist in the medical corps of the army.

FOREIGN

Paratyphoid Outbreak.—An outbreak of paratyphoid fever in a number of communities north of Wiesbaden, Germany, was reported July 3 from the office of the chief surgeon, U. S. Army Headquarters in Berlin, according to the Associated Press. Between 600 and 1,000 cases have been reported and the outbreak was believed spreading. It is said that locally produced milk was believed to be the source of infection.

Tuberculosis Increase in Germany.—According to the monthly report of General Lucius D. Clay, tuberculosis has increased more than 50 per cent in the American zone in Germany in the past year. About 14,500 patients with open tuberculosis have not been hospitalized because of lack of facilities. General Clay reports that the weekly average of new cases has increased from 923 in March to 1,259 in May. The known cases of active tuberculosis of the lung and larynx under medical supervision increased from 93,821 in July last year to 121,842 in April 1947. Of these the report said 35,539

were classed as open infectious cases. Slightly more than 21,000 beds are available for isolation in treatment of tuberculosis patients, the report said.

GENERAL

International Conference of Physicians.—The Royal College of Physicians of London is sponsoring an International Conference of Physicians September 8-13 in London. The scientific program, comprising nine sections, will be presented by authorities in the various specialties from Britain, the United States, Sweden, France, Switzerland, Norway, Denmark, the Netherlands, Belgium and Czechoslovakia. The speakers from the United States will be Dr. Helen B. Taussig, Baltimore, and Dr. Frank N. Wilson, Ann Arbor, before the section on cardiology; Dr. Franz J. Kallmann, New York, before the section on psychiatry, and Dr. John B. Grant, New York, before the section on social medicine. Admission to the conference is by invitation. Application must be made to the organizing secretary, Dr. Gordon B. Mitchell-Heggs, Royal College of Physicians, Pall Mall East, London, S. W. 1.

Resolution on Training in Anesthesiology.—The board of directors of the American Society of Anesthesiologists, Inc., June 11 in Atlantic City, adopted a resolution recommending (1) the establishment of departments of anesthesiology in all medical schools and hospitals under the direction of a doctor of medicine actively engaged in the practice of anesthesiology and (2) that the department of anesthesiology bear the same relationship to the medical school and/or hospital that is borne by other medical departments of the institution. The society also stated its disapproval of (1) the training of persons other than doctors of medicine in anesthesiology for the assumption of responsibility in the care of patients where it may be necessary to exercise medical judgment and particularly of the issuance of certificates for such training by its members and (2) the existence of departments of anesthesiology in hospitals and/or medical schools under the direction of persons other than doctors of medicine or under the nominal direction of doctors of medicine not actively engaged in the practice of anesthesiology.

American Congress of Physical Medicine.—The twenty-fifth annual scientific session and instruction course of the American Congress of Physical Medicine will be held September 2-6 at the Hotel Radisson, Minneapolis. Among many others, the following physicians will address the scientific sessions:

Khalil G. Wakim, Rochester, Minn., The Effects of Artificial Fever on the Circulation in Man.
Frederick A. Jostes, St. Louis, Back Manipulations.
Daniel J. Leithauser, Detroit, Early Ambulation and Related Procedures in Surgery.
James B. Mennell, London, England, Manipulation of the Joints of the Upper Extremity.
Frederic T. Jung, Chicago, Physical Physiology as a Basis for Physical Medicine.
Carl M. Peterson, Chicago, Physical Medicine in Industrial Insurance Practice.
Hart E. Van Riper, New York, A Challenge to Physical Medicine.
Robert E. Priest, Minneapolis, Results of Tracheotomy in Bulbar Poliomyelitis.
Abe B. Baker, Minneapolis, Pathology of Changes in Bulbar Poliomyelitis.

In addition to the scientific sessions the annual instruction courses will be held September 2-5 and will be open to physicians and therapists registered with the American Registry of Physical Therapy Technicians. For further information address the American Congress of Physical Medicine, 30 North Michigan Avenue, Chicago 2.

Admiral McIntire to Head Red Cross Blood Program.—Vice Admiral Ross T. McIntire, formerly surgeon general of the navy, has been named director of the new national blood program of the American Red Cross, which contemplates providing blood and its derivatives without cost to the entire nation. The blood program, patterned on methods employed during the war to procure blood donations for the armed forces, was approved by the Red Cross board of governors at a meeting in Cleveland in June. The program is being undertaken in direct response to the need of the medical profession for blood in saving lives as well as in the treatment and prevention of disease. The Red Cross plans call for the collection of blood at strategic centers throughout the country as well as by mobile units operating in rural areas. At the program peak an estimated 3,000,700 blood donations will be required annually. The five operations in connection with the blood program are (1) collecting blood, (2) processing it for use as whole blood and blood derivatives, including packing and storage, (3) distributing the blood and blood products, (4) making blood available for continuous research and investigation and (5) maintaining the high standards set in this field. During the first year of operation the Red Cross contemplates the establishment of twenty to twenty-five centers. The program will be financed through contributions made by the American people. It is estimated that from three to five years will be required before it is in full operation. Cost of the operation of the centers will be shared on an equitable basis between the national organization and the chapters.

Prevalence of Poliomyelitis.—Reports of cases of poliomyelitis for the periods indicated have been received from the division of public health methods, U. S. Public Health Service:

Division and State	Week Ended July 19, 1947	Week Ended July 20, 1946	Median, 1942-1946	Total to July 19, 1947	Total to July 20, 1946	Total * March 16-July 19, 1947	Total * March 17-July 20, 1946
New England:							
Maine	0	0	1	7	3	4	3
New Hampshire	0	12	3	5	19	1	18
Vermont	0	2	2	8	9	0	5
Massachusetts	1	1	3	16	8	9	4
Rhode Island	6	0	0	13	0	12	0
Connecticut	1	4	3	10	23	7	15
Middle Atlantic:							
New York	13	22	22	110	150	74	117
New Jersey	0	8	7	22	35	16	29
Pennsylvania	12	9	9	40	42	26	30
East North Central:							
Ohio	13	13	8	46	73	36	58
Indiana	2	5	4	25	26	9	21
Illinois	11	42	12	69	144	47	136
Michigan	3	7	7	43	34	19	26
Wisconsin	2	4	1	26	24	2	11
West North Central:							
Minnesota	5	97	0	35	178	22	177
Iowa	5	13	1	25	56	17	47
Missouri	4	34	4	33	83	23	76
North Dakota	0	3	1	20	7	15	7
South Dakota	0	11	0	2	19	0	19
Nebraska	1	20	1	33†	39	26	38
Kansas	3	35	7	23	90	5	86
South Atlantic:							
Delaware	0	0	0	1	1	1	1
Maryland	3	3	3	15	11	9	9
District of Columbia	0	0	0	3	2	1	1
Virginia	3	4	4	26	17	16	11
West Virginia	1	4	2	7	13	3	10
North Carolina	3	3	3	29	41	14	34
South Carolina	2	0	3	8	14	7	11
Georgia	2	3	4	26	51	19	43
Florida	2	24	2	53	362	28	313
East South Central:							
Kentucky	0	7	7	15	36	14	33
Tennessee	6	0	1	24	23	12	14
Alabama	1	33	3	24	169	11	166
Mississippi	0	19	5	22	70	5	53
West South Central:							
Arkansas	3	15	6	25	73	15	61
Louisiana	1	27	5	35	131	17	112
Oklahoma	0	6	6	21	70	10	64
Texas	9	61	61	87	452	62	424
Mountain:							
Montana	0	2	0	4	32	2	16
Idaho	10	1	0	25	2	15	2
Wyoming	0	8	0	6	10	3	9
Colorado	1	43	2	19	178	14	177
New Mexico	0	11	1	6	28	3	27
Arizona	0	9	0	12	20	9	17
Utah	0	0	0	6	13	1	7
Nevada	0	0	0	0	0	0	0
Pacific:							
Washington	0	2	1	28	65	20	32
Oregon	4	1	3	14	11	9	7
California	24	38	25	423	299	274	212
Total	157	666	...	1,575†	3,256†	964	2,789
Median, 1942-1946	...	...	369	2,048		1,653	

* Last two columns show reported incidence since approximate seasonal low week (week ended between March 15 and 21).
† Figures changed by corrected reports.

CORRECTION

Discussion at National Conference on Rural Health.—In the proceedings of the National Conference on Rural Health published in THE JOURNAL March 22, page 862, the discussion credited to Mr. Graham L. Davis, Michigan, should have been credited to Mr. Michael M. Davis, New York City.

Marriages

ALLAN HORACE WARNER, Woodside, N. Y., to Miss Tonya Jetti Morgenstern at Brooklyn April 20.

NEIL ESPOSITO, Brooklyn to Miss Regina F. Van Guilder of Rutland, Vt., in Passaic, N. J., April 12.

JOHN W. KETCHERSID, Ardmore, Okla., to Mrs. Mabel D. Haire at Springtown, Texas, May 14.

Deaths

Warren Beagle Davis ✠ Philadelphia; born in Jessamine County, Ky., Sept. 6, 1881; Jefferson Medical College of Philadelphia, 1910; specialist certified by the American Board of Otolaryngology; member of the founders group of the American Board of Plastic Surgery; clinical professor of plastic and reconstructive surgery at his alma mater; member of the American Society of Plastic and Reconstructive Surgery, serving as a member of the board and in 1936-1937 as president; fellow of the American College of Surgeons, College of Physicians of Philadelphia, Academy of Surgery of Philadelphia, American Academy of Ophthalmology and Otolaryngology and the American Laryngological Association; member of the American Association of Anatomists and the Association of Military Surgeons of the United States; during World War I served on the medical advisory board of the War Department for Pennsylvania and later as captain in the medical corps of the U. S. Army, where he had been in charge of the school of maxillofacial surgery at Camp Greenleaf, Fort Oglethorpe, Ga.; during World War II served as a member of the National Faculty of Plastic and Maxillofacial Surgery, appointed by the Surgeon General; on the staffs of the Jefferson and Frankford hospitals and the Kensington Hospital for Women; in 1938 received an honorary degree of doctor of science from Georgetown College, Georgetown, Ky.; in 1942 president of the alumni association of Jefferson Medical College; since 1941 member of the state board of plastic surgery, commonwealth of Pennsylvania; editor of *Plastic and Reconstructive Surgery;* died July 7, aged 65, of hypertensive cardiovascular disease.

Mathew Aaron Reasoner ✠ Colonel, U. S. Army, retired, Alton, Ill.; born in New London, Iowa, Nov. 1, 1875; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1899; Army Medical School in 1906, Army Industrial College in 1929 and the Medical Field Service School, Advanced Course, in 1930; served as physician for the Mexican Central Railroad; entered the medical corps of the U. S. Army as a first lieutenant in 1906; promoted through the various grades to that of colonel in 1932; retired Nov. 30, 1939; during World War I served overseas and with the Army of Occupation; served as chief surgeon in the department of the Philippines and had been corps area surgeon for the Sixth Corps Area in Chicago; assistant professor, Army Medical School, from 1914 to 1917; during World War II recalled to active duty and assigned as professor of military science and tactics at St. Louis University School of Medicine, where he became professor emeritus in 1946 and where he served in the department of public health; fellow and formerly member of the board of governors of the American College of Surgeons; died in St. Joseph's Hospital June 20, aged 71, of cerebral hemorrhage.

Harry Hampton Donnally ✠ Washington, D. C.; born in Georgetown, Ky., Sept. 4, 1877; Columbian University Medical Department, Washington, D. C., 1903; for many years professor and executive officer, department of pediatrics, at George Washington University School of Medicine, where he had been professor emeritus of pediatrics since 1943; specialist certified by the American Board of Pediatrics; fellow of the American Academy of Pediatrics serving as state chairman for the District of Columbia and the American Academy of Allergy; past president of the Society for the Study of Asthma and Allied Conditions; member of the Washington Academy of Medicine, the Clinico-Pathological Society and the George Washington Medical Society; for many years a member of the staff of the Children's Hospital, where he was a founder and director of the allergy clinic; attending physician for the Columbia Institution for the Deaf for many years; consulting pediatrician for Columbia Hospital, Gallinger Municipal Hospital and Glenn Dale (Md.) Sanatorium; died in Baltimore May 23, aged 69, of pneumonia.

Clarence Edward Skinner ✠ Darien, Conn.; born in New Haven, Conn., June 8, 1868; Yale University School of Medicine, New Haven, 1891; charter member and formerly vice president of the American Roentgen Ray Society; fellow of the New York Academy of Medicine; at one time physician in charge of the Newhope Private Sanitarium in New Haven, where he had been a director; secretary of the board of directors and medical superintendent of the Elm City Private Hospital; served as medical director of the Postal Life Insurance Company of New York and of the eastern division of the Western Union Life Insurance Company of Spokane, Wash., with headquarters in New York; for many years medical examiner in chief and consultant at the home office of the New York Life Insurance Company; died April 24, aged 78, of coronary occlusion.

Archie Marvin Roberts ✠ Los Angeles; born in Brandon, Texas, Aug. 8, 1902; Stanford University School of Medicine, San Francisco, 1929; assistant professor of medicine at the University of Southern California School of Medicine; specialist certified by the American Board of Internal Medicine; fellow and life member of the American College of Physicians; member of numerous societies; president of the Los Angeles Heart Association; chairman of the heart division, advisory committee of the Los Angeles Tuberculosis and Health Association; attending physician at the Los Angeles County Hospital, general staff member of the Good Samaritan Hospital and associate staff member at St. Vincent's Hospital; died April 1, aged 44, of coronary disease.

Frederick Wooten Wilkerson ✠ Montgomery, Ala.; born in Montgomery, Ala., Aug. 19, 1885; Columbia University College of Physicians and Surgeons, New York, 1909; specialist certified by the American Board of Internal Medicine; fellow and governor for many years of the American College of Physicians; member of the House of Delegates of the American Medical Association in 1920; served during World War I; past president of the Medical Association of the State of Alabama; member of the American Heart Association, Southern Medical Association and the Southern Interurban Clinical Club; on the staff of St. Margaret's Hospital; died April 24, aged 61, of hypertensive cardiovascular disease.

Charles Alford Maghy, San Diego, Cal.; born in Lucan, Ont., July 30, 1884; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1905; member of the American Medical Association, American Academy of Ophthalmology and Otolaryngology, Pacific Coast Oto-Ophthalmological Society, Oxford Ophthalmological Congress and the Ophthalmological Society of England, Ireland and Scotland; formerly associate professor of ophthalmology at his alma mater; specialist certified by the American Board of Ophthalmology; on the staff of the Mercy Hospital, where he died April 27, aged 62, of coronary embolism.

Henry John Storrs ✠ St. Louis; born in 1877; Johns Hopkins University School of Medicine, Baltimore, 1904; assistant professor of clinical gynecology and obstetrics at St. Louis University School of Medicine, where he had formerly been instructor and senior instructor in gynecology and obstetrics; instructor in obstetrics at his alma mater from 1907 to 1909; instructor in obstetrics and gynecology at the Washington University School of Medicine in St. Louis from 1910 to 1916; for many years on the staff of the Maternity Hospital; served on the staffs of St. Luke's and Bethesda General hospitals; died in West Chester, Pa., April 21, aged 70, of coronary thrombosis.

George Howitt Weaver ✠ Wilmette, Ill.; born at Sussex, Wis., Oct. 2, 1866; Rush Medical College, Chicago, 1889; formerly professor of pathology at his alma mater and at the Northwestern University Woman's Medical School in Chicago; past president of the Society of Medical History of Chicago; fellow of the Association of American Physicians; member of the American Association of Pathologists and Bacteriologists and the Chicago Pathological Society; for many years on the staffs of the Memorial Institute for Infectious Diseases and the Cook County Hospital; died in Evanston April 19, aged 80, of perforated duodenal ulcer with peritonitis.

Arthur Morris Zinkhan ✠ Washington, D. C.; born in 1890; Georgetown University School of Medicine, Washington, D. C., 1912; specialist certified by the American Board of Otolaryngology; formerly associate professor of otolaryngology at his alma mater; member of the American Academy of Ophthalmology and Otolaryngology and the American Laryngological, Rhinological and Otological Society; fellow of the American College of Surgeons; served in the Russian army and later in the U. S. Army during World War I; on the staff of the Episcopal Eye, Ear and Throat Hospital; died April 30, aged 56, of coronary thrombosis.

Frances Fenton Cattell Ancell, Tujunga, Calif.; Woman's Medical College of Pennsylvania, Philadelphia, 1896; for many years a medical missionary in China; died April 13, aged 80, of carcinoma of the rectum and coronary sclerosis.

Benjamin F. Brandt ✠ Cappeln, Mo.; Washington University School of Medicine, St. Louis, 1908; died April 29, aged 65, of coronary occlusion.

Nathan Bronfeld, Los Angeles; Loyola University School of Medicine, Chicago, 1916; member of the American Medical Association; died April 10, aged 62, of coronary sclerosis.

Joel Daniel Brown, Upper Darby, Pa.; Jefferson Medical College of Philadelphia, 1904; died February 3, aged 68, of bronchiectasis.

Ralph Alonzo Bunn, Dayton, Ohio; Miami Medical College, Cincinnati, 1900; died in Clearwater, Fla., April 14, aged 70, of coronary occlusion.

James M. Campbell, Goldthwaite, Texas; University of Texas School of Medicine, Galveston, 1896; member of the American Medical Association; vice president of the State Medical Association of Texas; past president of the Brown-Comanche-Mills-San Saba Counties Medical Society; served on the local Selective Service board during World War I and II; for many years surgeon for the Santa Fe Railway; died March 24, aged 73, of carcinoma.

Bertram Horace Caswell ✠ Somerville, Mass.; Tufts College Medical School, Boston, 1903; member of the New England Otological and Laryngological Society; served during World War I; served on the staffs of St. Elizabeth's and Massachusetts General hospitals in Boston; died in the Veterans Administration Hospital in Boston April 14, aged 72, of cerebral hemorrhage.

Gerritt Cotts ✠ Chicago; Rush Medical College, Chicago, 1921; fellow of the American College of Surgeons; on the staffs of the Augustana and Ravenswood hospitals, where he died May 13, aged 58, of heart disease.

Leo Allen Dermody, Omaha; John A. Creighton Medical College, Omaha, 1908; died April 5, aged 63.

George S. Dowell ✠ Braymer, Mo.; University Medical College of Kansas City, 1900; past president of the Caldwell-Livingston Counties Medical Society; died April 22, aged 71, of cerebral thrombosis.

Edward Morris Fahnestock ✠ Gulfport, Miss.; Louisville (Ky.) Medical College, 1897; served as county physician; killed April 2, aged 75, when the automobile in which he was driving was struck by a train.

Madison Aaron Furrh ✠ Major, U. S. Army, retired, Elysian Fields, Texas; Tulane University of Louisiana School of Medicine, New Orleans, 1935; interned at the Southern Baptist Hospital in New Orleans; entered the medical corps of the U. S. Army in November 1939; promoted to captain in November 1942; served during World War II; retired for disability in line of duty May 31, 1944 with the rank of major; killed in an automobile accident near Prescott, Ariz., March 18, 1946, aged 36.

Francis Ward Glann, Climbing Hill, Iowa; Sioux City College of Medicine, 1898; died April 20, aged 85, of senility.

John Dryer Green ✠ McPherson, Kan.; University of Nebraska College of Medicine, Omaha, 1931; medical missionary to China under the Free Methodist Church in charge of the Grinnell Memorial Hospital, Kihsien, Honan Province, China, from 1932 to 1938; died May 11, aged 44, of hypertension and nephritis.

Vivian Carsdale Hamilton, Oakland, Calif.; College of Medical Evangelists, Los Angeles, 1924; died April 15, aged 56, of a disease causing generalized adenopathy and obstruction of the lymph ducts.

Franklin Pierce Hannon, Rochester, N. Y.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1889; served during World War I; died in the Veterans Administration Hospital in Bath April 6, aged 81, of lobar pneumonia.

Ralph Emerson Henry ✠ Lieutenant Colonel, U. S. Army, retired, De Land, Fla.; University of Wooster Medical Department, Cleveland, 1910; U. S. Army Medical School in 1924; served during World War I; entered the medical corps of the U. S. Army with the rank of captain on July 1, 1920; retired with the rank of lieutenant colonel on Sept. 30, 1937 for disability in line of duty; died March 15, aged 61, of coronary thrombosis.

Carl M. Johnson ✠ Dawson, Minn.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1910; councilor of the Third District of the Minnesota State Medical Association; superintendent and director of the Dawson Hospital; died recently, aged 64.

Braxton Bynum Lloyd, Chapel Hill, N. C.; University of North Carolina School of Medicine, Raleigh, 1909; served as member of the board of directors of the Bank of Chapel Hill for many years; formerly mayor of Carrboro; died March 20, aged 60.

Ora Lee McCay, Romney, Ind.; Medical College of Indiana, Indianapolis, 1904; member of the American Medical Association; past president of the Tippecanoe County Medical Society; formerly county health commissioner; served during World War I; major, medical reserve corps, not on active duty; affiliated with the Home Hospital in Lafayette; died April 17, aged 67, of hypostatic pneumonia, chronic myocarditis and nephritis.

Alvin Oren McClelland, Youngstown, Ohio; University of Pittsburgh School of Medicine, 1894; died in the Mount Sinai Hospital in Cleveland March 27, aged 77, of prostatic hypertrophy.

Clara Louise McCord, Philadelphia; Maryland Medical College, Baltimore, 1913; died February 8, aged 61, of coronary occlusion.

Clyde A. Medlar, Verdon, Neb.; Northwestern University Medical School, Chicago, 1905; past president of the Richardson County Medical Society; served on the school board and as mayor; affiliated with Our Lady of Perpetual Help Hospital; died in Omaha April 1, aged 68, of coronary disease.

John Joseph Melvin ✠ Oakland, Calif.; Creighton University School of Medicine, Omaha, 1927; died April 6, aged 45, of myocardial infarction.

Frank John Miller, Pineville, Va.; University of Vermont College of Medicine, Burlington, 1894; member of the American Medical Association; affiliated with the Rockingham Memorial Hospital in Harrisburg, where he died April 13, aged 78, of carcinoma of the head of the pancreas.

Lewis Hitchner Miller, Woodstown, N. J.; University of Pennsylvania Department of Medicine, Philadelphia, 1895; member of the American Medical Association; on the staff of the Salem County Memorial Hospital, Salem; died April 8, aged 78, of coronary disease.

James Liguori Moriarty ✠ Milford, Conn.; Harvard Medical School, Boston, 1896; fellow of the American College of Surgeons; served during World War I; on the staffs of St. Mary's and Waterbury hospitals in Waterbury; died April 3, aged 75, of chronic myocarditis.

Joseph Henry Myers, Jackson, Mich.; Homeopathic Hospital College, Cleveland, 1893; died in Philadelphia April 15, aged 77, of coronary thrombosis.

James Donaldson Parker ✠ Fayette, Iowa; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1892; past president of the Fayette County Medical Society; died April 18, aged 79, of coronary thrombosis.

Charles Frederick Pettibone, Indiana, Pa.; Jefferson Medical College of Philadelphia, 1889; died February 7, aged 81, of mesenteric thrombosis.

Ray Emmett Alfred Pomeroy ✠ Medical Director, Captain, U. S. Navy, Washington, D. C.; University of Oregon Medical School, Portland, 1916; U. S. Naval Medical School, 1925; fellow of the American College of Surgeons; entered the U. S. Navy on Jan. 28, 1922; died Nov. 4, 1946, aged 52, of coronary thrombosis.

John Purdy, Philadelphia; Jefferson Medical College of Philadelphia, 1896; served during World War I; died in the U. S. Naval Hospital February 11, aged 76, of coronary sclerosis and bronchopneumonia.

William Perry Reaves, Greensboro, N. C.; University of the South Medical Department, Sewanee, Tenn., 1903; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; died in Winston-Salem, April 2, aged 71, of cardiovascular renal disease.

Ernest Slemmons Reedy ✠ Seattle; Marion-Sims College of Medicine, St. Louis, 1898; served during World War I; on the staffs of the Doctors and Harborview hospitals; died April 9, aged 75, of dissecting aneurysm of the aorta.

Jesse Lilly Saddler, Lagrange, Ohio; Cleveland Homeopathic Medical College, 1905; member of the American Medical Association; served during World War I; formerly mayor of Bay Village; treasurer of Lagrange; served on the staff of the Memorial Hospital in Elyria; died April 9, aged 72, of lobar pneumonia.

Otho Daniel Schaul, Philadelphia; Jefferson Medical College of Philadelphia, 1892; died February 4, aged 78, of intestinal obstruction.

Charles Cicero Shaw, Oklahoma City; Eclectic Medical University, Kansas City, Mo., 1905; Kansas City College of Medicine and Surgery, 1916; also a graduate in law; formerly state senator; served overseas during World War I; died April 3, aged 69, of pneumonia.

John Edward Smaltz ✠ Media, Pa.; University of Pennsylvania School of Medicine, Philadelphia, 1929; served overseas during World War II; affiliated with the Graduate Hospital of the University of Pennsylvania in Philadelphia, where he had been connected with the Presbyterian and Methodist hospitals; on the staffs of the Media (Pa.) Hospital and the Chester and Crozer hospitals in Chester; died April 18, aged 47.

Erwin David Spiegl, Lynn, Mass.; Deutsche Universität Medizinische Fakultät, Prague, Czechoslovakia, 1928; member of the American Medical Association; on the staff of the Lynn (Mass.) Hospital and the Beth Israel Hospital in Boston, where he died April 6, aged 45, of acute myocardial infarction.

Archibald Redd Stone ✠ Columbus, Ohio; Washington University School of Medicine, St. Louis, 1909; served during World War I; medical director and member of the board of directors for the Midland Mutual Life Insurance Company; died April 13, aged 60, of coronary thrombosis.

Arthur Ernest Strong, Altadena, Calif.; Syracuse University College of Medicine, 1898; served during World War I; formerly health officer of Mount Vernon, N. Y.; at one time on the staff of the Norwalk (Calif.) State Hospital; died April 5, aged 72, of bronchopneumonia.

Gilbert Bernard Tepper, Los Angeles; University of Illinois College of Medicine, Chicago, 1927; on the staff of the Queen of Angels Hospital, where he died April 4, aged 43, of heart disease.

Frank Adelbert Tinker, Lapeer, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1884; member of the American Medical Association; health officer; past president of the Lapeer County Medical Society; served as mayor, on the school board and as alderman; died April 8, aged 87, of pneumonia.

Albert Roling Tucker, Manistique, Mich.; Michigan College of Medicine and Surgery, Detroit, 1899; member of the school board; served during World War I; died April 1, aged 70, of heart disease.

Walter Jabez Weiser, Marion, Ohio; Eclectic Medical Institute, Cincinnati, 1894; served as county coroner and city health commissioner; served during World War I; died April 24, aged 76, of cerebral hemorrhage.

John Latham Wethered, Laurel, Md.; University of Pennsylvania Department of Medicine, Philadelphia, 1890; member of the American Medical Association; resident physician at the Laurel Sanitarium, where he died April 3, aged 79, of cerebral hemorrhage.

Robert William Wilcox ✠ Seal Beach, Calif.; Stanford University School of Medicine, San Francisco, 1917; fellow of the American College of Surgeons; served during World War I; on the staffs of the Seaside and St. Mary's hospitals in Long Beach; died April 6, aged 56, of coronary occlusion.

Arthur John Wilkinson, Camarillo, Calif.; Detroit College of Medicine, 1901; veteran of the Spanish-American War and World War I; affiliated with the Camarillo State Hospital; died in the Mercy Hospital, San Diego, April 9, aged 68, of adenocarcinoma of the stomach with metastasis.

John Roy Williams, Palo Alto, Calif.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1903; served during World War I and later as surgeon in the U. S. Public Health Service; died April 15, aged 70, of coronary thrombosis.

Walter Scott Wood, Trimble, Mo.; Marion-Sims College of Medicine, St. Louis, 1896; member of the American Medical Association; died March 31, aged 75, of arteriosclerosis.

Mordecai A. Worsham, Centerville, Ark.; Memphis (Tenn.) Hospital Medical College, 1883; died in Wichita, Kan., April 6, aged 89, of arteriosclerosis.

LIEUT. (JG) ROBERT G. RICKERT
(MC), U. S. N. R., 1915-1945

CAPT. RALPH WILLIAM SNODGRASS
M. C., A. U. S., 1905-1946

LIEUT. CHARLES G. BUTLER
(MC), U. S. N., 1913-1945

KILLED IN ACTION

Robert Garfield Rickert, Ann Arbor, Mich.; University of Michigan Medical School, Ann Arbor, 1939; served an internship and residency at the Henry Ford Hospital in Detroit; at one time affiliated with the Veterans Administration in Dearborn; began active duty as a lieutenant (jg) in the medical corps of the U. S. Naval Reserve in August 1944; medical officer aboard the *Terror;* killed in action May 1, 1945, during the Okinawa campaign, aged 30.

Ralph William Snodgrass, Des Moines, Iowa; Rush Medical College, Chicago, 1932; interned at St. Luke's Hospital in Kansas City, Mo., and at St. Louis Maternity Hospital in St. Louis, where he also served a residency; served a residency at the Barnes Hospital in St. Louis; began active duty as a captain in the medical corps, Army of the United States, on Aug. 31, 1942; reported missing July 2, 1944 while en route to the Asiatic theater after the sinking of the *Jean Nicollet,* a liberty ship in the Indian Ocean; according to the War Department, presumptive date of death, as required by law, is Dec. 18, 1946, aged 39.

Charles Gleason Butler ✠ Lieutenant, U. S. Navy, Los Angeles; University of Southern California School of Medicine, Los Angeles, 1940; interned at the U. S. Naval Hospital in San Diego; entered the U. S. Navy in July 1940; assigned to the Asiatic Fleet; lost South of Java; presumed dead Nov. 25, 1945, aged 32, by the U. S. Navy Department.

Foreign Letters

LONDON

(From Our Regular Correspondent)

June 28, 1947.

The Protection of Workers Against Radioactive Substances

New rules for the protection of workers in radioactive substances are announced by the minister of labor. All persons working with or near luminous compounds must be examined within seven days of starting work, and thereafter at intervals of not more than one month. A health register to include all workers must be kept. Those engaged in the manipulation of luminous compounds must wear photographic film for one week in every three months. This is to check the sufficiency of other precautions, which include the prohibition of more than forty-eight hours of work a week, and provision for three months in other employment after each full year's employment on processing. Measures are also laid down for keeping the air and all surfaces free from luminous compounds and for protection by special clothing and by screening.

Streptomycin Treatment of Tuberculous Meningitis

In the hospitals there is a much greater demand for streptomycin for the treatment of tuberculous meningitis than the supply of the drug. This is not due to the belief that its value has been proved but to the fact that there is no other remedy for this hopeless disease. At first all supplies came from the United States, but three British firms have set up the complex plant required for its production. By next spring these hope to produce about 250 Gm. a month. As 350 Gm. is necessary for the treatment of 1 case, the British output can play little part in the treatment of the 1,500 to 2,000 cases which occur annually. In the face of this shortage the Medical Research Council has decided that all streptomycin reaching this country must be passed through its hands for the use of research workers. It has set up special units for streptomycin treatment at the Hospital for Sick Children, Great Ormond Street, Hammersmith Hospital, Guy's Hospital, the National Hospital for Nervous Diseases, Alder Ley Hospital, Liverpool, and the Royal Hospital for Sick Children, Glasgow. At these hospitals selected cases, mostly of tuberculous meningitis, are being treated under strictly controlled conditions.

A New Classification of Tuberculosis

The recommendations of the Joint Tuberculosis Council for the revision of the classification and terms to be used in annual returns have been adopted by the minister of health. Tuberculous patients will be divided into two classes, A and B, according to whether tubercle bacilli have not or have been recovered. Patients may be transferred at any time from class A to class B. But those from whom tubercle bacilli have not been recovered within the first eight weeks of observation should be placed in class A. Single positive bacteriologic reports, unconfirmed by further search and unsupported by clinical or x-ray evidence of tuberculosis, may be ignored.

Respiratory cases are to be further subdivided into three groups: group 1, in which constitutional disturbance is slight, and there are signs of x-ray changes; group 3, in which there is profound systemic disturbance or constitutional deterioration, and pronounced impairment of function; and group 2, which includes all cases that cannot be placed in groups 1 or 3.

An uncomplicated pleural effusion for which no other cause can be found should be regarded as tuberculous, and the case placed in group 1 of class A or B, according to the bacteriologic report on the fluid.

PARIS

(From Our Regular Correspondent)

July 13, 1947.

Measures Taken Against Quack Medicine

In view of the lately increased diffusion among the public of various treatments, often detrimental to public health and escaping the control of qualified scientific societies, the director for social hygiene has drawn up a report to the Ministry for Public Health recommending the creation of a consultative commission composed of selected and qualified members and of representatives of scientific organizations which would be entrusted with the study of those remedies.

The minister for public health has applied to the National Academy of Medicine for collaboration, and the latter has appointed a special commission, called the Quack Commission, on behalf of which at a recent meeting, Professor Leroux delivered a statement of the question. After a discussion to which, among others, Professors Dujarric de la Rivière, Bezançon, Brouardel and Rist took part, the academy decided on a course of action. It has agreed to depute a representative to the commission established by the minister which shall also have to deal with remedies which, though not being officially recognized, have nevertheless certain useful therapeutic properties. On the other hand, the academy has emphasized that, as formerly, it retains its entire liberty of studying by itself all questions concerning quack medicine, as it has done lately as regards cancer and tuberculosis. It has decided to exert a direct immediate action against quack medicine by means of a careful supervision of all communications and, as regards the public, by contributing to conferences and lectures and to radio and film propaganda; as regards the medical body, by contributing to conferences for doctors aiming to keep them informed on little known remedies. The "New Therapeutics Commission," lately established in the academy, will also be rendered more efficient. This commission will have to reply to all queries from doctors concerning remedies. These replies will remain confidential. Besides this direct action, the academy will pursue a lengthy work, which consists in preparing, in collaboration with the Ministries of Justice and for Public Health, special laws on this subject. In the meantime the Consultative Commission to the Ministry for Public Health has been created.

Precise Endobronchial Penicillin Therapy of Lung Abscesses

Penicillin, intramuscularly administered, has not given satisfactory results in abscesses of the lung and above all does not take the place of surgical intervention. Charles Mättei M. Recordier, M. Tristani, H. Metras and A. Barbe of Marseilles have succeeded in treating clearly delimited abscesses of the lung with their method of endobronchial instillations of penicillin.

The technic, simple and always without bronchoscopy, is as follows: After a good local anesthesia with pontocaine, the authors direct, under screen control, a special india rubber sound of various curvatures, opaque to rays, in the abscess region. Once the sound is placed, the patient is extended in a position sloping downward with respect to the part to be subjected to instillation; then a syringe filled with 50,000 or 100,000 Oxford units diluted respectively with 10 or 20 cc. of serum, kept tepid at about 25 degrees, is connected to it. Those instillations are repeated every other day except in the presence of abundant hemoptysis. Treatment can be effective with four instillations of 50,000 or 100,000 Oxford units, but as a rule eight to twelve are necessary. By means of iodized oil the authors verify the precision of the instillations at the beginning of the treatment and after its completion. They emphasize that neither the age of the abscess nor the doses employed are

important, but that the zonal location, determining the route of endobronchial access, is the important factor. The authors have set forth before the National Academy of Medicine and the Medical Society of the Paris Hospitals their complete clinical and radiologic observations in 81 cases of pulmonary abscesses thus treated with great success, always without bronchoscopy and with absence of danger (2,320 instillations were performed without incident). At the same time they illustrated, by means of projections, the definition of the "frank" abscess, for which endobronchial penicillin therapy is to be applied. Among the 81 cases the authors have noted 50 clinical and radiologic cures, 16 cases of decided improvement with clinical cure but persistence of some x-ray signs, 5 cases of distinct improvement characterized by the disappearance of fetidness and the almost complete disappearance of sputum, extensive improvement of the general condition but persistence of the x-ray signs and 10 failures, 6 neoplasms, 2 polycystic lungs, 1 abscess with retractile cavity and 1 old seat of abscess on a pleura largely fused.

An Unpublished Manuscript of Claude Bernard

An unpublished manuscript of Claude Bernard, one of the founders of classic French medicine, who died seventy years ago, has been found among the documents and notes of the late Professor d'Arsonval. Its title is "Principles of Experimental Medicine." It is going to be published under the auspices of Dr. Delhure of Paris.

Compulsory Medical Examination of School Children

The Medical School Services are making preparations for the medical examination of all children attaining school age in October. This preventive examination, performed free of charge, takes the place of the Social Security System third examination. Half a million children will be examined, the first occasion of this sort in France.

ITALY

(From Our Regular Correspondent)

FLORENCE, June 12, 1947.

National Congress for Internal Medicine

At the first postwar national Congress for Internal Medicine, held in Florence at the same time as that for surgery, Professor Cesare Frugoni, director, Medical Clinic, University of Rome, paid tribute to the members who died during the war. A paper on tumors of the colon was presented by Professor Alessandrini in joint session with the Surgical Society. Professor Guido Izar of Siena presented a paper on modern conceptions of malaria. According to the speaker, malaria has been given the honors of the stage in a medical congress after fifty-six years of silence. The many famous Italian malariologists have died except for Professor Giuseppe Bastianelli, who is the chief of the National Institute for Malariology. Professor Izar said that a short time ago only three species of plasmodia were considered causative agents of malaria in man: Plasmodium vivax, Plasmodium malariae and Plasmodium falciparum. A fourth parasite was discovered, Plasmodium ovale, which is more benign. This parasite may rarely be encountered in Europe and is of less importance than in the American and African countries. Formerly it was axiomatic that the parasite transmitted by the bite of the mosquito may invade the red blood corpuscles to start the asexual cycle and that the plasmodium may survive and reproduce itself only in the red elements. Today we know that the sporozoites do not penetrate directly the red elements but that they may first invade some tissue cells, especially those of the reticuloendothelial system, starting the cycle of asexual reproduction and giving place to the merozoites, which may attack the red elements of the blood. This modern concept is important for prophylaxis and treatment of malaria because the sporozoites, the elements which may derive from them in the lymph channels and the elements of the so-called histotropic phase of the monogonic asexual cycle are refractory to the known antimalarial preparations. This fact explains the fallacy of chemical prophylaxis whether it is carried out with quinine derivatives, acridine derivatives or sulfonamides. In considering the second phase of the development of the malaria parasites following the disappearance of fever, the speaker stated that the parasites have not disappeared from the vertebrate host, for after a variable length of time (sometimes after a decade) fever may reappear and the clinical picture of malaria may be repeated. Professor Ascoli used the term "focal phase" for this period, emphasizing that the parasites have their seat in foci. Professor Izar concludes that one may accept the hypothesis that during these long latent periods the parasites may be lodged in the internal organs but not in the red blood corpuscles, although in tissue cells.

In discussing prophylaxis of the malarial infection—which must be distinguished from malarial disease—the speaker emphasized that up to now prophylaxis has been instituted on mistaken bases for which little proof has been furnished. Today we are in a position only to carry out a symptomatologic prophylaxis with regard to the course of malaria in delaying and in reducing the clinical picture by means of chemical prophylaxis. Many of those in attendance participated in the discussion.

Professors Cesare Frugeni and Coppo of Rome reported on the third subject, "epidemic hepatitis." During World War I episodes were described which today would most likely be classified as infections of epidemic hepatitis, but only the experiences in the recent war have established beyond doubt that epidemic hepatitis cannot be caused by bacteria or by any known toxins. Epidemic hepatitis may at present be considered an infectious disease caused by an ultravirus with an initial general infection which later may be localized in the liver, spontaneously contagious from man to man by direct contact with drops of saliva and of nasopharyngeal mucus. Sometimes it may spread among a group of persons by pollution of food or water with feces or urine of patients. It may also be transmitted artificially from man to man. Rise of temperature may sometimes occur unexpectedly after an incubation period of one month's duration on an average. There follows a second phase with the disappearance of fever and the occurrence of hepatocellular icterus of variable intensity, which, however, may not be obligatory. Among the symptoms are disturbances of digestion with constipation and increase in volume and in firmness of the liver; splenomegaly may be frequent. Leukopenia with lymphomonocytosis may be present. The so-called reaction of hepatic serolability may precociously be positive, while heterophil agglutination may always give negative results. The course as well as the clinical picture may be atypical.

Prognosis generally is favorable, and definite recovery with functional and anatomic restitutio ad integrum of the liver may occur in 99 per cent of the cases. Complications may occur. Rarely grave symptoms may develop which may be reversible but from which death may result with a picture of acute hepatic atrophy.

In prophylaxis, gamma globulin injections proved effective during the incubation period. The administration of convalescent serum may be associated with the risk of transmitting the same hepatitis in the form of the so-called icterus of homologous serum or posttransfusion hepatitis.

Nicotinic acid and liver extract may be useful for treatment. The patient should be placed on a liver protective diet. In cases with a protracted course and with symptoms of dangerous insufficiency of the liver, highly satisfactory results may be obtained with the administration of large quantities (10 to 12 liters in three days) of isotonic glucose solution by means of a duodenal tube. Other forms of hepatitis have been described

as related to epidemic hepatitis, with which they have features in common; e. g. the considerable number of cases of hepatitis with jaundice a hundred days after transfusion of blood, serum or plasma. Cases of hepatitis after vaccination against yellow fever as after the administration of antitoxic serums represent only particular aspects of posttransfusion hepatitis, because the blood of the convalescent may be the vector of the icterogenic virus. Episodes of icterus accidentally transmitted from one person to another by means of an unsatisfactorily sterilized syringe have in addition been reported.

Professor Coppo and Professor Frugoni commented on the remarks of the discussers. With reference to the benign character of epidemic hepatitis which was questioned by some of the discussers, the speakers held that in spite of some malignant episodes the disease usually has a benign character and recovery without sequels occurs in almost every case.

The congress selected Rome for the next annual meeting and, as subjects for papers, (1) the mediastinal syndrome (in cooperation with the Italian Society of Surgery), speaker from the medical point of view, Professor Condorelli of the University of Catania; (2) encephalitis, speaker, Professor Greppi of Florence; (3) medical treatment of thyrosis, speaker, Professor Bastai of Padua.

Pasteur Celebration

Italy participated in the celebration of the fiftieth anniversary of the death of Pasteur in Paris through a delegation of scientists under the chairmanship of Professor Marotta, director general of the Superior Institute of Health. Professor Alberti reviewed the work of Professor Giuseppe Sanarelli and Professor Alessandro Salimbeni, the Italian pupils of Pasteur, the first of whom died shortly before the recent war and the second during it. The work of Professor Sanarelli is so extensive that it cannot be summarized briefly. The activities of Professor Salimbeni are closely associated with the practice of vaccination; he worked with Roux and Metchnikoff on cholera, with Calmette on plague, with Marchoux on yellow fever and spirilla and on antityphus vaccination with Widal. Other Italian pupils of Pasteur are Professors Malfitano and Stassano, while Professors Camillo Ninni and Federigo Netti have worked at the Pasteur Institute in Paris.

BARCELONA

(From Our Regular Correspondent)

June 10, 1947.

Rheumatism

Little work has been done on rheumatism within the field of internal medicine in Spain. Except for the first contributions of Professor Gregorio Marañon's school, which were stopped by the civil war, of Professor J. Cuatrecasas (now in exile) and of Dr. M. Bastos (now without a department of his own to work in, owing to political reasons), it may be said that, up to a few years ago, there was no complete rheumatologic work done in Spain. But now it has been taken up by Professor A. Pedro y Pons, professor of internal medicine at the Barcelona Faculty, and his disciple Dr. P. Barceló Torrent, head of the rheumatism clinic of that body, the first rheumatism department to be set up in Spain.

Dr. P. Barceló, who had already published a monograph in 1941 entitled Reumatismos articulares cronicos (Salvat, Barcelona), gave us another in 1945 with the title Reumatismos vertebrales (Salvat, Barcelona) in which he expounded with great clearness his personal views on rheumatic pathology. In the latter book he paid careful attention to the clinical study of the small vertebral articulations; but now he has written, jointly with the head of the radiology department of the Barcelona Faculty, Dr. J. M. Vilaseca Sabater, a further monograph devoted exclusively to this subject (Patologia de las pequeñas articulaciones inter-vertebrales: Clínica y Radiología, Salvat, 1946). Dr. Vilaseca's contribution is a model of exposition. Since the first papers of Dittmar (1931), didactic works on this subject have been very scarce. The chapters devoted to the anatomy, the x-ray observations and the pathologic systematizing of these disorders, to the uncovertebral articulations, the costovertebral and the costotransverse ones, constitute a good personal contribution.

We have to stress the greatness of the task achieved in this field at the present time by Professor Pedro y Pons's school, which led up to the recent foundation of the journal *Revista Española de Reumatismo y Enfermedades osteoarticulares* under the sponsorship of Professors Pedro y Pons, G. Marañon, J. Gibert Queralto, J. M. Vilardell, the anatomopathologist, J. Sánchez Lucas, a disciple of Aschoff, and M. Bastos Ansart. The assistant editors are Drs. P. Barcelo and J. M. Vilaseca. This review has already published comprehensive papers on senile vertebral kyphosis and osteoporosis by Dr. Pedro y Pons and the anatomic morphology of rheumatic lesions by Dr. Sánchez Lucas and has just published a paper by Dr. M. Bastos and his son Dr. Bastos Mora on an undescribed disorder of the Tarsian skeleton, a process marked by a reactional inflammation round a healthy bone fragment (which, at first, may have been an ossification nucleus detached from the astragalus or a necrotic inflammation of the spongy bone) followed by an expelling reaction in the subjacent bone. The journal is publishing two complementary monographs on ancylopoietic spondyloarthritis (October 1945) and the intervertebral disk, written jointly by some of the best specialists on rheumatism of the Barcelona school. The former contains detailed studies of 153 cases seen at the rheumatism clinic and of others seen privately by some of the writers, and in it the pathogenic concepts developed by Barcelo stand out. In the latter may be mentioned the chapter by Sánchez Lucas on the anatomopathology of the disk, the one by Bastos on the mechanopathology of the spine and the disks, in which he gives us the full fruits of his rich experience and sifted judgment; the one on radiology by Drs. Vilaseca and Vilar Bonet; that by Pedro y Pons and Barcelo on the isolated discal degeneration syndrome and a good revision of concepts by Professor Gibert Queralto on the disk in rheumatic spondylopathies.

All this work has been done by the rheumatologic school of Barcelona, where the best work on the subject is now being done in Spain. And it is to be expected that these enthusiastic collaborators will garner gratifying fruits for Spanish rheumatology, which had given but few signs of life since the days of Marañon and Cuatrecasas's early essays. Now the fight against rheumatism will be energetically undertaken and pursued with state aid, and its direction has been entrusted to other schools, which have done, notwithstanding, less valuable work than that of these men in Barcelona.

Endocarditis

Professor A. Pedro y Pons's school has also carried out some excellent investigations in the field of brucellosis, viz. "Exanthematic Mediterranean Fever," by Pedro y Pons; "Leptospirosis," by P. Farreras Valenti; "Acute Glomerulonephritis" and "Werloff's disease," by the same writer, a studious and intelligent assistant professor in the same department; "Weil's Disease," by J. Gibert Queralto, and "Nephritic Forms of Endocarditis Lenta" by Pedro y Pons.

Speaking of endocarditis, under the direction of Dr. L. Trias de Bes, the director of the Infectious Diseases Hospital at Barcelona, systematic, clinical and experimental investigative work is being carried out which is to be reported at the Spanish Cardiology Congress to be held in Barcelona next December. L. Trias de Bes, with the help of Drs. A. Foz, J. Gras Riera, L. Borras and F. Ballesta, is now examining this problem in a broad manner and his preliminary communications lead us to

expect ample results of great interest. Trias de Bes has described a type of bacteremic endocarditis lenta with a positive blood culture, an almost normal plasmatic syndrome, a short clinical course and well defined features, responding well therapeutically to the indicated antibiotics; and another opposite type the blood culture of which is repeatedly negative, with an intense plasmatic syndrome, a lengthy evolution with intermittent remissions and a fatal ending, resisting all antibiotics and chemotherapeutic preparations. The plasmatic syndrome which the authors point to as a differential facet is characterized by an increase of total proteins, the inversion of the albumin-globulin quotient (which becomes almost normal during the remission phases), high Weltman reaction values, maximum flocculations in Takata's reaction and early and accentuated formaldehyde and lacto jellifications of the serum. This work of Trias de Bes and his fellow investigators, some of whom also work with Professor Pedro y Pons, has enabled them to differentiate between two types of endocarditis lenta with far different prognoses and treatments, and the data furnished are the first instalments of their interesting report. One of their advance communications has appeared in the review *Medicina Clinica*, which has just published practically the whole of the papers written in Catalonia and a large part of Spain. It is directed by Dr. Pedro y Pons, with Dr. P. Farreras Valenti as editor in chief, and may be considered the best journal published in our country, being certainly the one with the largest circulation.

BUENOS AIRES

(From Our Regular Correspondent)

July 10, 1947.

A New Pregnancy Test

A new pregnancy test in which the male toad is the reacting animal has been proposed by Dr. C. Galli-Mainini (*Sem. méd.* **54**:337 [March] 1947). The technic is simple: Ten cc. of a morning urine specimen is injected subcutaneously in the toad Bufo arenarum Hensel. After a period of two or three hours a drop of the toad's urine is obtained by means of a pipet inserted in the cloaca and is placed under the microscope. The positivity or negativity of the reaction is indicated by the presence or absence of spermatozoa in the toad's urine.

In 1929 Houssay and Lascano-Gonzalez observed that implantation of the anterior hypophysial lobe in the toad released the spermatozoa in the seminal tubes. De Robertis, Burgos and Breyter (1945) found that the Sertoli cells become swollen and vacuolized and release the spermatozoa, which pass out into the kidneys. Galli-Mainini observed that chorionic gonadotropin releases the spermatozoa, which are then easily found in the toad's urine.

As stated, the response is observed in two to three hours. Spermatozoa can be easily observed with a low power lens and without staining. Positive results were obtained only with the urine of pregnant women. Of the 485 positive reactions, 177 were made with a simultaneous Friedman test; the results coincided in 168; there were only 5 positive in the toad and only 3 in the rabbit. Of all the urines from pregnant women tested 92 per cent were positive, but the percentage is higher for the urine of the first months of pregnancy. None of the sexual or adrenal hormones or substances provoke the release of the spermatozoa. It has been obtained in some cases with rat hypophysis. The urine of patients with chorionepithelioma or an ectopic pregnancy gave a positive test. A higher percentage of positive tests were obtained with urine than with serum.

This new test has the advantage of being simple, rapid, specific and economical, as the urine and the microscopic examination do not need previous preparation and the toads need no special care; also the same animal can be used repeatedly.

BRAZIL

(From Our Regular Correspondent)

São Paulo, June 24, 1947.

Treatment of Tuberculous Meningitis with Streptomycin

Drs. Mario Mursa, João Batista dos Reis and J. Renato Woiski published recently the first report in Brazilian medical literature of a case of tuberculous meningitis in a child aged 5 years successfully treated with streptomycin. The Koch bacillus was present in the cerebrospinal fluid, and inoculation into guinea pigs was positive. Treatment was begun eight days after the onset of the meningeal signs and it lasted seventy-one days, the total dose of streptomycin given being 44,600,000 units (42,650,000 intramuscularly and 1,950,000 intrathecally, by means of lumbar and cisternal punctures). Promin was given in association with streptomycin in the final days of treatment. Drs. Mursa, Reis and Woiski believe that the results were due to streptomycin alone, which, since therapy was started, definitely improved the course of the disease. Forty days after treatment was discontinued the patient behaved normally, with no neurologic sequelae. Repeated tests of cerebrospinal fluid denoted progressive improvement, and at the end there was only lymphocytic pleocytosis (71 cells per cubic millimeter), increase of the protein content and a thin fibrinous reticulum. In spite of these good results they cannot affirm a complete recovery because the time of observation is still too short to allow a definite estimation.

Leukotomy in Treatment of Epilepsy

Soon after the cerebral leukotomy of Egas Moniz, Freeman and Watts was introduced in psychiatry as a method of treatment its application was extended to epilepsy with not very encouraging results. Dr. Mário Yahn of the Hospital de Juquery, São Paulo, chose 6 chronic epileptic patients on whom to study the effects of frontal and parietal leukotomy on the disease and secondary deviations of behavior. One patient with psychopathic personality, misconduct and hysterical and epileptic fits recovered fully after the operation. Of 2 other patients with infantile encephalopathy, hemiplegia and deviations of behavior, 1 greatly improved as to the rate of seizures, without mental changes. In the other the number of seizures was later reduced.

Of 3 other patients with essential epilepsy with deviations of behavior, 2 showed good results, and the third showed signs of aggravation. The mental state of 1 patient was improved.

Dr. Mário Yahn believes that the verified improvements do not result directly from the sectioned pathways but from a new postoperative integration. Leukotomy cannot yet be used as a routine method of treatment for epilepsy. Only in chronic and very serious cases with frequent seizures and misconduct in which shock therapy has failed should cerebral leukotomy be employed.

Cyst of the Choledochus

Dr. Erasto Gartner, professor of the Faculdade de Medicina of Curitiba, Paraná, recently reported a case of cystic dilatation of the choledochus in a 14 year old patient in whom surgical exploration by a right lumbotomy showed a retroperitoneal tumor. After puncture of the cyst, from which 1,500 cc. of bile was taken, and a large incision made on its posterior wall, it was possible to observe the proximal and distal holes of the channel, resembling aneurismal sacks. The reconstruction was made by the Matas technic. The suture was made over a plummet, which was left loose in the manner of Pierre Duval, and the patient was completely cured without postoperative incidents. It is the first choledochus reconstruction made in this way. The process was called "choledochorraphy" in honor of Rudolph Matas of New Orleans. On consulting the international literature Dr. Gartner found that 183 cases have been reported.

Correspondence

CORONARY DISEASE

To the Editor:—Dr. Falk's paper on coronary disease (THE JOURNAL, June 7, p. 491) not only repeats the ancient legend that blood cholesterol is independent of dietary cholesterol intake but specifically recommends junket and eggs as daily dietary ingredients for patients with coronary disease. Falk seems not to have noted the fall in blood cholesterol reported by Kempner in 79 patients on a rice diet (the average fall was from 243 to 186 mg. per hundred cubic centimeters, *Bull. New York Acad. Med.* **22**:361 [July] 1946) or the consistent slight rise in blood cholesterol noted in normal women fed four egg yolks daily (Okey, Ruth, and Stewart, Dorothy: *J. Biol. Chemi.* **99**:717 [Feb.] 1933).

Granting that blood cholesterol is rather stable, rising and falling slowly when diets rich in cholesterol and calories are administered or discontinued, and that going without favorite foods is to many a "fate worse than death," it must be conceded that atheromas form more slowly in races on a low cholesterol intake, that atheromas occur in fatal form precociously in those with high blood cholesterol (xanthomatosis, diabetes mellitus) and that high blood cholesterols are the rule in those who have coronary disease before 50 (Lerman, J., and White, P. D.: *J. Clin. Investigation* **25**:914 [Nov.] 1946). It is also certain that ingestion of egg yolk, butter and cream furnishes calories and cholesterol in concentrated form. If a patient is concerned about duration of life, if he feels some obligation to his dependents, it would seem to be proper for him to reduce his weight to the ideal for his body build at age 20 and to avoid the substances noted as regular items of diet. No doctor should prescribe them for him.

Arguments against this view are summarized by Peters (Quantitative Clinical Chemistry, vol. **1**:534-1536, Baltimore, Williams & Wilkins, 1946). These arguments are precisely the same as those which were used to destroy the theory of Villemin that tuberculosis was an infection. Not all the people heavily exposed to tuberculosis or cholesterol die of the disease; the lesions in experimental animals differ in some respects from those in man. On the other hand, no one who is not exposed to tuberculosis dies of that disease, and no one with a blood cholesterol under 150 mg. per hundred cubic centimeters is likely to die of coronary disease. Dogs, rabbits and chickens all get atheroma when the blood cholesterol is kept above 250 mg. per hundred cubic centimeters, and the higher the level the more rapidly do severe lesions develop. These lesions all resemble human atherosclerosis far more closely than Villemin's guinea pig tuberculosis resembled human phthisis.

We read today that millions are to be spent for research on heart disease, and we hope this may lead to reduction of blood cholesterol without dietary restriction. More men's lives would be saved by this than by a specific cure for cancer. Meantime, geographic pathology, clinical observation and experimental pathology have shown how atherosclerosis can be prevented, or even reversed, by dietary restriction alone. Whether this is worth while for those who live to eat is beside the point; doctors must tell their patients how to eat in order to prolong their lives.

Hypertensive people (who have five times the incidence of coronary disease of the normotensive), those with bad family records of coronary disease and those who are obese or have high blood cholesterols should be clearly informed of the advantages of a low calory diet, low in egg yolk, butter and cream. They might even be informed of the fact that on a vegetarian reducing regimen life not only will seem longer but statistically it will be longer.

WILLIAM DOCK, M.D., Brooklyn.

OBESITY

To the Editor:—In his paper on "Psychic Factors in the Development and Treatment of Obesity" (THE JOURNAL, February 8, p. 369) Dr. Freed laid particular stress on the etiologic importance of psychosomatic factors in the pathogenesis of obesity. In his communication April 5 (p. 1032) Dr. Freyhan emphasized the constitutional aspects. Both these factors play an essential role. After all, every case of obesity is brought about by "overfeeding," either absolutely or relatively. However, we would underestimate the complexity of the question if we believed that these two factors are sufficient to solve completely the problem of obesity (or likewise of emaciation). Even if factors such as temper, basal metabolism, alimentary extravagance, the specific dynamic effect of food and caloric consumption during and after physical exertion are properly taken into account, we are left with a number of patients whose tendency toward obesity remains unexplained. And, strangely, this is particularly true of the extreme types of obesity such as are sometimes found with pituitary tumors, tumors in the occipital fossa compressing the aqueductus cerebri and so on. Localized obesity, e. g. lipomatosis of the lower extremities in hyperthyroidism represents a special problem. Here a localized failure to combust fats in spite of a generally increased oxidation in the organism plays the decisive role (Zondek, H., and Loewy, A.: *Ztschr. f. klin. Med.* **95**:282 [Nov.] 1922). This localized obesity is certainly difficult to interpret from the psychosomatic point of view. I should like to mention that form of obesity which I described about twenty years ago and designated as "water-salt obesity" (*Deutsche med. Wchnschr.* **31**:1267 [July 31] 1925). In such cases water and salt retention accompanied by a tendency toward fat deposition in the tissues appears to be the essential etiologic factor. I am unaware of the incidence of this type of obesity in the United States, but in the Middle East (e. g. Palestine, Iraq, Syria, Egypt) it is widespread. This type of obesity does not react to treatment on the so-called glandular basis or to caloric restriction or to psychic approach but only to restriction of water and salt intake and to mercurial diuretics and other dehydrating measures.

HERMAN ZONDEK, Jerusalem.

MEDICAL EDUCATION IN ITALY

To the Editor: In an article by Dr. W. C. Davison (THE JOURNAL, April 6, p. 921) the condition of Italian medical education before and after the second world war was criticized. I feel it my duty to clarify the facts.

The inevitable consequences of a long war deprived us of valuable men, material and buildings. At present, two years after the end of the war, Italian universities are in financial difficulties, with a greatly increased number of students. The expenses which have been met already and which are necessary to reconstruct the damaged buildings are absolutely enormous. Replacement of equipment (instruments, reagents, animals, books) is another heavy problem. It is feared that some old universities will have to be closed for lack of funds. However, medical scientific activities have never ceased. In October 1946 the first postwar national medical meetings took place in Florence and were remarkably successful.

The results achieved in Italy in the scientific medical field are worthy of general recognition. For example, hematology is a branch of pathology which has always appealed to our research workers. The discovery of acute erythremia, the extensive study of the acute erythremic condition, of Cooley's and related syndromes and of their relationships to constitutional hyperhemolysis and hemolytic icterus with increased globular resistance, the study of bone marrow in surviving

explants, the neoplastic interpretation of acute and chronic leukemias and the establishment of different characters among various types of acute monocytic leukemias represent some of the work recently done in this field.

Italian doctors are skilful in controlling the diffusion of pulmonary tuberculosis caused by the war and malnutrition. The method of so-called endocavitary aspiration for the treatment of pulmonary cavities, some types of apicoaxillary thoracoplasty and special types of extrapleural pneumothorax are recent discoveries of Italian phthisiology. Experimental and clinical tests with lipotropic agents have given excellent results in the relationship between the function of the adrenals and lipotropic action, pregnancy and hepatic steatosis due to deficiency of labile methyl groups and the lipotropic effect and functional efficiency of the liver in the hepatomegalic diabetes of the young.

The new views on an intracellular cycle of the malarial parasite (histotropic phase) have been repeatedly confirmed by the increased observations due to the diffusion of malaria as a consequence of the destruction of antimalaria wards during the war. Prominent in the field of allergic diseases in our country are the problems of histamine and artificial antihistaminic drugs.

The discovery in Italy of electric shock was an important contribution to scientific advancement in the field of psychiatry. The identification of infantile acrodynia as a syndrome due to deficiency of pyridoxine is one of our most important contributions in this branch.

A serious problem to be solved is that of Italian medical literature. Efforts must be made to have our work better known abroad.

I hope I have made clear that Italian doctors can be favorably compared to those of other European countries.

I thank the Editor for the opportunity offered me to express my opinion on the subject.

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Head of the Department of Internal Medicine, University of Rome; President, Italian Society for Internal Medicine.

STREPTOMYCIN THERAPY AND EOSINOPHILIA

To the Editor:—The observation of eosinophilia in patients with tuberculosis under therapy with streptomycin in the absence of eruption is reported by Farrington and his associates in THE JOURNAL, June 21, page 682. In 9 of 14 subjects the eosinophilia first appeared during the second and third months of therapy and was not associated with symptoms or signs suggesting sensitivity to the drug. A similar phenomenon has been observed in the therapy of leprosy with streptomycin (Faget and Erickson: Use of Streptomycin in the Treatment of Leprosy: A Preliminary Report, read before the Antibiotic Study Section, U. S. Public Health Service, Washington, D. C., Feb. 1, 1947). These authors found that the peak of eosinophilia occurred during the twelfth week of treatment, following which the eosinophil count gradually dropped. Only one patient had a conspicuous skin eruption, though 3 other patients had milder attacks of dermatitis. Eosinophilia was observed in all 10 patients treated. Erickson informed me that they have observed eosinophilia in patients with leprosy for as long as five months after discontinuance of streptomycin therapy, and that all patients had normal counts prior to the treatment.

The fact that the eosinophilia appeared in some instances to rise to a peak and then to recede while therapy was continued suggests a definite effect on the infection. In experiments in which purified lipid fractions of tubercle bacilli were injected into human beings (Harrell, G. T.: *J. Clin. Investigation* **23**:943 [Nov.] 1944) the cellular reaction in tissue removed at biopsy revealed considerable numbers of eosinophils as well as polymorphonuclear neutrophils and epithelioid cells. This finding suggests a possible mechanism for the eosinophilia. If streptomycin inhibits the growth of acid fast organisms so that the immune response of the body destroys moderate numbers of Mycobacteria, the gradual destruction of the cell body would liberate these firmly bound lipids. The observation that the phosphatide and wax are biologically active, as is shown by the production of chronic wheals, would suggest that a firmly bound portion of the molecule, probably a polysaccharide, is released in the tissue and elicits the eosinophil response.

If the development of eosinophilia can be correlated with a subsequent favorable clinical response, a simple means of estimating the efficacy of streptomycin therapy will be available. It is conceivable that the absence of an eosinophil response in the second month of therapy might be indicative of the development of a drug fast strain, which could then be investigated by cultural methods. The rise and fall of reticulocytes in patients with pernicious anemia under therapy with liver is well known and represents an analogous measure of the effectiveness of therapy through a hematologic response.

GEORGE T. HARRELL, M.D., Winston-Salem, N. C.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

BOARDS OF MEDICAL EXAMINERS
BOARDS OF EXAMINERS IN THE BASIC SCIENCES

Examinations of the boards of medical examiners and boards of examiners in the basic sciences were published in THE JOURNAL July 26, page 1121.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: *Parts I and II.* Various centers, Sept. 15-17. *Part III.* Durham, Oct. 21-23. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia 2.

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF ANESTHESIOLOGY: Part II. *Oral.* Cleveland, Oct. 5-11. Sec., Dr. P. M. Wood, 745 Fifth Ave., New York 22.

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOGY: *Part I. Oral.* Chicago, Oct. 24-26. Final date for filing application is Aug. 1. *Part II. Written.* Various centers, Sept. 15. Sec., Dr. G. M. Lewis, 66 E. 66th St., New York 21.

AMERICAN BOARD OF INTERNAL MEDICINE: *Oral.* Chicago, Oct. 8-10. Asst. Sec., Dr. W. A. Werrell, 1 West Main St., Madison 3.

AMERICAN BOARD OF NEUROLOGICAL SURGERY: *Oral.* Chicago, May or June. Final date for filing application is Feb. 1. Sec., Dr. W. J. German, 310 Cedar St., New Haven, Conn.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: *Part I. Written.* Various Centers, Feb. 6. Final date for filing application is Nov. 1. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh 6.

AMERICAN BOARD OF OPHTHALMOLOGY: Chicago, October 6-12. Sec., Dr. S. Judd Beach, 704 Congress St., Portland, Me.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: Part II. Chicago, Jan. 22-23. Final date for filing application is Sept. 15. Sec., Col. F. M. McKeever, 1136 W. Sixth St., Los Angeles 14.

AMERICAN BOARD OF OTOLARYNGOLOGY: Chicago, Oct. 7-11. Sec., Dr. D. M. Lierle, University Hospitals, Iowa City, Ia.

AMERICAN BOARD OF PATHOLOGY: Chicago, Oct. 24-25. Final date for filing application is Sept. 15. Sec., Dr. Robert A. Moore, Euclid Ave. and Kingshighway, St. Louis 10.

AMERICAN BOARD OF PEDIATRICS: Dallas, Dec. 5-7. Philadelphia, Jan. 9-11. Sec., Dr. Lee F. Hill, 718 Royal Union Bldg., Des Moines 9.

AMERICAN BOARD OF PLASTIC SURGERY: Examinations are given in April and November of each year in the home town of applicants. Applications should be sent to Sec., Dr. Louis T. Byars, 508 N. Grand Blvd., St. Louis.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: *Oral.* New York, December. Final date for filing application is Sept. 15. Sec., Dr. Francis J. Braceland, 102-110 Second Ave., S. W., Rochester, Minn.

AMERICAN BOARD OF RADIOLOGY: *Oral.* Boston, Nov. 26-30. Final date for filing application is Aug. 1. Sec., Dr. B. R. Kirklin, 102-110 Second Avenue, S. W., Rochester, Minn.

AMERICAN BOARD OF UROLOGY: Chicago, February. Final date for filing application is Nov. 1. Sec., Dr. Harry Culver, 1409 Willow St., Minneapolis 4.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Coroners: Validity of Statute Relating to Jurisdiction.—The plaintiff filed an action for a writ of mandamus to direct the county coroner to change his verdict in a particular case from "suicide" to "accidental death." From a judgment for the defendant, the plaintiff appealed to the court of appeals of Ohio, Cuyahoga County.

The plaintiff's husband was admitted to a hospital on Nov. 8, 1945, where he underwent surgical treatment. After the operation he was placed in a room on the fourth floor of the hospital and during the period between the 8th and 11th, and until shortly before his death, he was given several dosages of phenobarbital as part of the essential medical treatment prescribed for him. About 1:40 p. m. on Nov. 11, 1945 the body of the plaintiff's husband was found on the ground outside the hospital building, the exact manner and means by which the body got there being unknown. The coroner made a finding that the immediate cause of death was "multiple fractured ribs, internal injuries, suicide, jump from window," but the plaintiff alleges that when the coroner made this decision he was not in possession of all the facts and information relating to the death of the deceased, especially such as relate to the influence of the administration of phenobarbital as a sedative. She contends that the graded cumulative effect of the administration of phenobarbital, coupled with postoperative shock, was sufficient to cause deceased's mental processes to become impaired and that the coroner would and should have rendered a different decision as to the cause and manner of death had he been in possession of all the facts relating thereto. The coroner incorporated in his verdict, and in the death certificate filed with the registrar of vital statistics in Cleveland, his decision of suicide and the plaintiff urges that the decision is in part erroneous and that the verdict of the coroner should have been that deceased came to his death by "accidental" means.

Prior to 1945 it was thought that the jurisdiction of a coroner, under statutes existing at that time, was confined to cases where there was a "suspicion of death" by criminal means. In 1945 certain sections of the coroner act were amended so that the jurisdiction and authority of the coroner was, for the first time in the history of the state, enlarged to cover cases involving civil liability. For instance, section 2855-5 provides for cases where "any person shall die as a result of criminal or other violent means, or by casualty, or by suicide" and section 2855-7 contains the words "whether by violence to self or from any other person or persons." Section 2855-16, provides: "The cause of death, the manner and mode in which the death occurred, as delivered by the coroner and incorporated in the coroner's verdict and incorporated in the death certificate filed with the registrar of vital statistics, shall be the legally accepted manner and mode in which the death occurred and the legally accepted cause of death, unless the court of common pleas of the county in which the death occurred, after hearing, directs the coroner to change his decision as to the cause, mode and manner of death." From the plain language of this section, said the court of appeals, we conclude that the legislature intended to enlarge the jurisdiction of the coroner to cases of death where civil rights and liabilities may be involved.

It is urged by the defendant, however, that the language of section 2855-16 providing for a hearing by the court of common pleas is so incomplete, vague, indefinite and uncertain that it is impossible to determine with any reasonable degree of certainty what the legislature intended. It is then argued that, since there is no other provision to supplement section 2855-16, the deficiency is such as to render it impossible of execution and therefore void.

It is clear, said the court, that the legislature, by enacting section 2855-16, intended to clothe the court of common pleas with jurisdiction to direct the coroner to change his decision as to the cause, mode and manner of death if, in the judgment of the court, the coroner's verdict is not justified by the evidence. The serious question, however, is how, or in what manner, this legislative intent is to be effectuated under the statute as written. It will be noted that, under this and the other new sections of the General Code, there is no method prescribed as to the manner in which the decision of the coroner shall be brought before the common pleas court. There are no provisions describing the person or persons who shall or may be made parties to such action, and the section is wholly silent as to how such parties shall be brought before the court for adjudication. Furthermore there does not appear to be any other provision of law conferring jurisdiction on the court of common pleas to decide such questions either in original or review proceedings and no other statutory provision setting forth the nature of such proceeding. Continuing, the court said that there is another important question in this case, namely, whether or not there is a grant of judicial power to the coroner, a ministerial officer, to make a finding in an ex parte proceeding affecting constitutional rights in civil matters. While we are not concerned with the wisdom or policy of the legislature, said the court, we must be concerned with the constitutional rights of any persons who may be prejudiced by an ex parte finding of a ministerial officer in a proceeding in which they are not made parties and in which they are not afforded means of becoming parties for the purpose of asserting their rights.

After discussing the new provisions of the coroner's statute and considering prior Ohio cases and cases from other jurisdictions, the court concluded that the new sections were an attempt by the legislature to vest the coroner with judicial power in civil matters between private parties which is repugnant to the Ohio Constitution vesting full judicial powers in the court; that the legislature attempted to authorize the coroner to make "legally accepted findings" having the power of judicial decisions affecting civil rights in ex parte proceedings, without making adequate provisions for defining means for persons adversely affected thereby to be made parties or become parties for the purpose of asserting and protecting their rights; that the legislature attempted to vest the court of common pleas with the power to direct the coroner to change his finding in a civil matter so that it will thereafter have the force of a judicial decision without providing the method or means by which such jurisdiction shall be exercised and without providing some mode or method which will guarantee the parties their constitutional rights to have their day in court. Such a statute, said the court, is inoperative and void for uncertainty and indefiniteness, deprives a party of his fundamental rights and is violative of both the Ohio and the federal constitutions. Accordingly the judgment of the trial court in favor of the defendant was affirmed.—*State v. Gerber, Coroner, 70 N. E. (2d) 111 (Ohio, 1946).*

Medical Motion Pictures

FILM REVIEW

The Control of Voluntary Muscles (Some Principles of Kinesiology). Directed by Frederic T. Jung, Ph.D., M.D., and William H. Lazear, D.D.S. Produced in 1943 by Northwestern University Medical School. Photography by Mervin W. LaRue. 16 mm., color, silent, 575 feet (two reels). Showing time twenty-three minutes. Procurable by rental, $2, or by sale from Audio-Visual Medical Education Department, Northwestern University Medical School, 303 East Chicago Avenue, Chicago 11.

This film clearly portrays muscle action in the human body. Primary attention is given to the muscles ordinarily used in large muscle activities and those which are most often involved in therapeutic exercise. The position, shape and attachment of muscles are first illustrated by drawings and their action then demonstrated by a living model.

The film is intended as a visual teaching aid for courses in kinesiology as provided for students in physical education and physical therapy. The purpose of the film is not to provide a general overall view of the subject but rather to present some aspects of kinesiology from the standpoint of voluntary muscle control.

While it will prove most useful for students in physical education and physical therapy, it may also be of real value in stimulating interest in general courses in anatomy. The color photography is excellent.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1937 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied with stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American J. Obstetrics and Gynecology, St. Louis

53:721-900 (May) 1947. **Partial Index**

Presidential Address: Individualism. J. H. Moore.—p. 721.
Menorrhagia Associated with Irregular Shedding of the Endometrium: Clinical and Experimental Study. E. G. Holmstrom and C. E. McLennan.—p. 727.
Physiologic Action of Human Chorionic Hormone: Production of Pseudopregnancy in Women by Chorionic Hormone. W. E. Brown and J. T. Bradbury.—p. 749.
*Combined Evipal and Scopolamine Analgesia and Cyclopropane Anesthesia in Obstetrics. H. E. Anderson.—p. 758.
Stress Incontinence in the Female. R. A. Reis and E. J. De Costa.—p. 776.
Constriction Ring Dystocia. L. Rudolph and C. Fields.—p. 796.
*Minimal Spinal Anesthesia in Vaginal Delivery: Analysis of 1,000 Consecutive Cases. J. A. Haugen and R. C. Benson.—p. 805.
Management of Delivery Following Stillbirth from Previous Dystocia. A. B. Hunt and R. W. DeVoe.—p. 812.
Blood Calcium: Normal Curve for Pregnancy. R. L. Newman.—p. 817.
Experience with Midpelvic Dystocia: Preliminary Report. W. C. Eller, W. F. Mengert, W. H. Andrew Jr. and R. J. Jennett.—p. 823.
Penicillin and Acute Puerperal Mastitis. C. P. Hodgkinson.—p. 834.
*A 55 Pound Solid Uterine Myoma. W. D. Beacham, J. A. Holmes, H. T. Beacham and others.—p. 839.
Leiomyofibroma of Uterus and Endometrial Carcinoma. R. S. Siddall.—p. 846.
Study of Interaction of Pregnancy and Hypertensive Disease. L. C. Chesley, J. E. Annitto and D. G. Jarvis.—p. 851.
Placental Metabolism of Vitamin C.: II. Histochemical Analysis. J. H. Holzaepfel and A. C. Barnes.—p. 864.
Spontaneous Annular Detachment of the Cervix During Labor. C. B. Ingraham and E. S. Taylor.—p. 873.
Subacute Bacterial Endocarditis During Pregnancy. M. E. Davis and R. F. Wortmann.—p. 878.

Analgesia and Anesthesia in Obstetrics.—Anderson studied 700 obstetric cases in which the combined amnesic and anesthetic action of evipal soluble given rectally, scopolamine hydrobromide given hypodermically and cyclopropane administered by inhalation was found safe and effective. Analgesia and amnesia were complete in 93 per cent of cases; in 7 per cent little or no relief of pain was experienced. The 4 stillbirths occurring in this group had no connection with the analgesia and anesthesia. Less than 7 per cent of newborn babies required artificial resuscitation. All of these survived with no further trouble after resuscitation. About 5 per cent of patients became difficult to manage while under sedation. This is an improvement over results with most barbiturate-scopolamine combinations. Cervical lacerations amounted to 4 per cent and were repaired immediately following delivery. This small incidence of laceration speaks well for the relaxing effect of evipal and scopolamine on the cervical muscle fibers. There was an increase in the proportion of perineal application of forceps in vertex presentation, especially in primigravidas, whenever analgesia and surgical anesthesia were used.

Minimal Spinal Anesthesia in Delivery.—Haugen and Benson analyze 1,000 cases delivered under "minimal dose spinal anesthesia." Metycaine 22.5 mg. (1.5 cc. of a 1.5 per cent solution) was found to be the minimal practical dose and was used in every instance. There were no instances of the usually feared side effects of spinal anesthesia in the obstetric patient. "Minimal spinal anesthesia" in this series proved to be a safe and desirable anesthetic method for operative vaginal delivery, and the results indicate that it deserves a place in the obstetrician's armamentarium for use in selected cases.

A 55 Pound Solid Uterine Myoma.—Beacham and his associates report the removal from a woman aged 59 of a solid myoma which weighed 55 pounds (25 Kg.) and measured 17 inches (43 cm.) in diameter. The patient is enjoying excellent health four years after operation.

American Journal of Psychiatry, New York

103:577-720 (March) 1947. **Partial Index**

Psychiatric Experience in the War, 1941-1946. W. C. Menninger.—p. 577.
Accomplishments of Psychiatry in the Army Air Forces. J. M. Murray.—p. 594.
Psychiatric Casualties in Submarine Warfare. I. F. Duff and C. W. Shilling.—p. 607.
The Paranoiac Officer and the Officer Paranee. H. Rosen and H. E. Kiene.—p. 614.
Pragmatic Psychotherapy in Military Training Centers. B. A. Cruvant.—p. 622.
Use of Hypnosis in Treatment of Acute Combat Reactions. F. D. Kartchner and I. N. Korner.—p. 630.
Experience with Group Psychotherapy as a Method of Treatment for Veterans. M. Grotjahn.—p. 637.
Utilization of a Therapy Group in Teaching Psychotherapy. S. B. Hadden.—p. 644.
Psychotherapy for General Practitioner: Program for Training. T. A. C. Rennie.—p. 653.
Homosexual Woman. J. MacKinnon.—p. 661.
Use of Electric Shock Therapy in Psychoneurosis. D. M. Hamilton.—p. 665.
Evaluation of Shock Therapy. L. Salzman.—p. 669.
Effects of Electrically Induced Convulsions on Respiration in Man. M. D. Altschule, W. M. Sulzbach and K. J. Tillotson.—p. 680.
Program for Training Attendants in Mental Hospitals. Laura W. Fitzsimmons and C. P. Fitzpatrick.—p. 685.
Brain Metabolism in Man: Unanesthetized and in Pentothal Narcosis. W. A. Himwich, E. Homburger, R. Maresca and H. E. Himwich.—p. 689.
Emotions in the Allergic Individual. F. C. Metzger.—p. 697.
Psychologic Factors in Men with Peptic Ulcers. F. T. Kapp, M. Rosenbaum and J. Romano.—p. 700.

Annals of Otol., Rhin. and Laryngology, St. Louis

56:1-244 (March) 1947. **Partial Index**

Subdural Empyema Secondary to Frontal Sinusitis: Review of Clinical Features and Report of 3 Cases. F. M. Anderson.—p. 5.
Ménière's Disease. T. Cawthorne.—p. 18.
Antibiotics in Treatment of Sinus Infections. H. P. Schenck.—p. 39.
*Histologic Effect of Repeated Application of Certain Nose Drops to the Nasal Mucous Membrane of Rabbits. R. E. Ryan.—p. 46.
Basic Principles of Radiation Therapy. L. F. Morrison.—p. 74.
Use of Streptomycin in Treatment of Diffuse External Otitis. B. H. Senturia and R. H. Brob-Kahn.—p. 81.
Some Present Day Concepts of Headache: Analysis of 1,000 Cases of Headache. J. H. Hersh.—p. 98.
Congenital Choanal Atresia: New Surgical Approach. W. K. Wright, G. E. Shambaugh Jr. and L. Green.—p. 121.
Use of Thrombin in Nasal Surgery. S. L. Fox.—p. 127.
*Acute Mastoiditis Masked by Penicillin Therapy. J. H. Barrett.—p. 135.
Severe Epistaxis and Its Management: Report of 11 Cases in Which External Carotid Artery Was Ligated. A. A. Spar and O. E. Hallberg.—p. 141.
Treatment of Certain Specific Types of Headache with Histamine. F. K. Hansel.—p. 152.
Poliomyelitis and the Otolaryngologist. P. M. Hamilton.—p. 161.
Premedication in Tonsillectomies in Children Under Six Years Old. Margaret Noyes Kleinert.—p. 168.

Effect of Application of Nose Drops on Nasal Mucosa of Rabbits.—Ryan used two types of proprietary nose drops to determine the effect of nose drops on the nasal mucous membrane of rabbits. Each of these preparations quickly destroyed the cilia. There was no evidence of development of new cilia during the study. The epithelium was transformed into stratified squamous epithelium. The author concludes that the overuse of nose drops is harmful to the nasal mucous membrane of the rabbit. The clinical picture in rabbits was similar to that observed in human beings who had used nose drops excessively. Nose drops should not be used promiscuously.

Acute Mastoiditis Masked by Penicillin Therapy.—Barrett shows that penicillin will cure most cases of acute otitis media if given in adequate doses, the exceptions being the ones due to bacteria that are insensitive to the drug. Penicillin is effective in the phlegmonous form of acute mastoiditis. After the infection has progressed to the stage of coalescent mastoiditis the drug alone is not sufficient. The severity of the disease process is reduced, but the usual clinical symptoms and findings are often distorted. Penicillin therapy changes the clinical picture of lateral sinus phlebitis, meningitis and petrositis. Surgical intervention in addition to the administration of penicillin is necessary in the majority of such cases to effect a cure.

Canadian Medical Association Journal, Montreal

5:361-474 (April) 1947

Clinical Differentiation in Syndrome Called Atypical Pneumonia. J. D. Adamson and R. E. Beamish.—p. 361.
Use and Limitations of Hearing Aids. G. A. Fee.—p. 366.
Chronic Empyema G. F. Skinner.—p. 371.
*Splenosis. G. G. Stobie.—p. 374.
*New Factors in Etiology of Obliterative Arterial Disease. J. C. Luke.—p. 377.
Surgery of Heart Disease. J. H. Palmer.—p. 380.
Surgical Management of Gangrenous Bowel in Infancy. D. E. Ross and B. L. Jewett.—p. 386.
*Cerebral Air Embolism Following Artificial Pneumothorax: Treatment with Prolonged Inhalation of Oxygen. H. G. Kelly, W. C. Gibson and J. F. Meakins.—p. 388.
Management of Asthma. H. K. Detweiler.—p. 392.
Folic Acid in Treatment of Pernicious Anemia. M. J. Tuttle and J. W. Scott.—p. 396.
Personality Changes Associated with Surgical and Radiation Castration. F. E. McNair.—p. 400.
Auricular Flutter: Results of Therapy in a General Hospital over a Ten Year Period. W. N. Bell and G. F. Strong.—p. 404.
Myopia. A. L. Morgan.—p. 406.
Etiology and Treatment of Hyperemesis Gravidarum. W. N. Kemp.—p. 409.
Psychomotor Epilepsy. G. A. Davidson.—p. 410.
Brucellosis. J. W. Scott.—p. 414
Treatment of Motion Sickness: Review of Therapeutic Studies Sponsored by National Research Council of Canada R. L. Noble, E. A. Sellers and C. H. Best.—p. 417.

Splenosis.—Stobie points out that hypersplenism is being looked on as a possible cause for the destruction of all or certain elements of the blood, such as that found in thrombocytopenic purpura, where only the platelets of the blood are affected, and again in congenital hemolytic icterus, where a destruction of the erythrocytes takes place. The increased pigments in the blood and tissues from the brokendown erythrocytes which must be excreted by the liver result in a high incidence of gallstones of the bile pigment type. That the spleen is the causative factor in these two blood diseases is proved by the improvement that follows splenectomy. True accessory spleens are found only in areas where splenic tissue developmentally arises. There is, however, another condition in which multiple pieces of splenic tissue are found attached and growing throughout the whole peritoneal cavity. This condition is splenosis which results from seeding of splenic pulp cells. The author reports the occurrence in a woman aged 23 of seeding after splenectomy for nontraumatic reasons. Surgical technic for splenectomy should be designed to remove completely all blood from the abdominal cavity, and the abdominal wall incision should also be protected from splenic blood to prevent implants. A recurrence of congenital hemolytic icterus following splenectomy may be caused by splenosis.

Obliterative Arterial Disease.—Luke reviews 25 cases recently studied in the vascular service of the Royal Victoria Hospital. Clinical and laboratory investigations and studies of specimens of leg arteries suggest that Buerger's disease is much less common than is generally believed. It is a generalized progressive disease responding only briefly to the present methods of treatment, including sympathectomy. Leg amputation is a frequent sequel. The group showing the chronic degenerative process on biopsy has a much better prognosis, owing to the slowness of the progression of the disease. These cases show a long lasting improvement following lumbar sympathectomy. The author is of the opinion that the many glowing reports previously published of the good results of sympathectomy and other treatments in Buerger's disease are incorrect, as what is being reported as Buerger's disease is not necessarily proved. A correct etiologic diagnosis of arterial occlusive disease of the legs is most difficult, especially in the young and middle aged group. Biopsy of one of the main arteries, preferably at the time of sympathectomy, will give the most information possible.

Oxygen in Air Embolism Following Artificial Pneumothorax.—Kelly and his associates report the history of a woman aged 28 in whom cerebral air embolsm followed artificial pneumothorax. Initial convulsions, coma, hemianopsia and hemianesthesia disappeared, but there was a residual left sided hemiparesis. Serial electroencephalograms showed obliteration of normal cortical activity in this instance, with a gradual return toward normal. The continuous breathing of pure oxygen for a period of nine and one-half hours, even though delayed for an interval of three days, was associated with great improvement. Present day methods of treating air embolism following artificial pneumothorax are ineffectual. The author urges the use of pure oxygen breathing over long periods to combat the unfavorable effects of cerebral air embolism immediately following the introduction of air into the circulation.

Delaware State Medical Journal, Wilmington

19:59-76 (April) 1947

Periarteritis Nodosa: Case Requiring Surgery, with Review of the Literature. T. J. Bulger.—p. 59.
Intussusception. Case Report. J. N. Attie.—p. 66.
Krukenberg Tumors. M. E. Conrad.—p. 68.

Industrial Medicine, Chicago

16:219-274 (May) 1947

Absenteeism and Separation in Relation to Length of Employment. K. Brodman and L. P. Hellman.—p. 219.
Mass Chest Survey at Douglas Aircraft Plant. E. C. Armes.—p. 225.
Medical Records. C. E. Martin.—p. 228.
*Cold Wave Dermatitis: Report of 2 Cases. C. M. McGill and L. F. Ray.—p. 238.

Cold Wave Dermatitis.—According to McGill and Ray "cold wave" preparations contain organic, inorganic or synthetic chemicals in a strong alkaline medium which dissolve the horny sheath of the hair while it is being wound to the desired curl; then the keratolytic solution is neutralized with water or hydrogen peroxide and the hair returned to its normal consistency, "permanently" maintaining its new shape. These substances can irritate the skin of the beauty operator or the customer if contact is prolonged or frequent. In addition to being primary irritants, these materials may also develop a localized sensitivity after repeated use. Two clinically proved cases and 11 cases allegedly due to these preparations are cited.

Journal of Gerontology, Springfield, Ill.

1:153-296 (April) 1946

Geriatrics. E. J. Stieglitz.—p. 153.
Study of Pathogenesis of Chronic Pulmonary Disease (Bronchiectasis) of Old Rats. J. A. Saxton Jr., L. L. Barnes and Gladys Sperling.—p. 165.
Geriatric Urology. J. S. Ritter and A. Sporer.—p. 181.
Factor of Age in Determining Toxicity of Certain Poisons. W. deB. MacNider.—p. 189.
Effects of Estrogens on Senile Skin. M. A. Goldzieher.—p. 196.
Preparation for Retirement. E. H. Moore.—p. 202.
Influence of Aging Process on Distribution of Certain Components of Blood and Gastrocnemius Muscle of Albino Rat. S. M. Horvath.—p. 213.
Comparative Chronologic Age in Man and Other Mammals. S. A. Asdell.—p. 224.
German Health Insurance: Evolution of a Bureaucracy. Elizabeth W. Wilson.—p. 237.

1:297-410 (July) 1946

Relationship of Medical Practice to Gerontology. J. E. Paullin.—p. 297.
*Splenectomy for Patients Past Sixty. G. M. Curtis and D. Movitz.—p. 303.
Selective Placement of Older Workers. C. Kuh.—p. 313.
Effects of Androsterone, Estradiol and Thyroid Hormone on Artificial Premature "Climacteric" of Pure Gonadal Origin Produced by Ovariectomy in Rats: I. Effects on Weights of Organs. V. Korenchevsky and Vera E. Jones.—p. 319.
Id.: II. Effects on Histologic Structure of Liver and Kidneys. Vera E. Jones and V. Korenchevsky.—p. 336.
Histochemical Changes Associated with Aging: IV. Liver, Brain and Kidney in Rat. O. H. Lowry, A. B. Hastings, C. M. McCay and Andrea N. Brown.—p. 345.
Age and Infection: Review. F. Duran-Reynals.—p. 358.
British National Health Insurance: The Workers' Pride. Elizabeth W. Wilson.—p. 374.

Splenectomy in Patients Past Sixty.—Curtis and Movitz say that of 200 consecutive splenectomies done at Ohio State University Hospital there were 14 that were done on patients past 60. The good results obtained by splenectomy for congenital hemolytic icterus, primary thrombocytopenic purpura, Banti's syndrome and some of its clarified complexes indicate the procedure for these diseases in the aged. It also appears probable that splenectomy is indicated for excessive splenic thrombocytolysis or hemolysis in lymphatic leukemia. The hazards of splenectomy and those resulting from senescence are analyzed. The study reveals that no patient of the elderly group

succumbed to the relatively hazardous operation of splenectomy because of senescence. Splenectomy for those who survived the operative procedure has been worth while from two points of view: The patients have improved or recovered from the splenic disease, and, secondly, their expected length of life has suffered little or no interference from the previous splenic disease.

Journal-Lancet, Minneapolis

67:171-222 (May) 1947

Epidemiology of Streptococcal Infections. F. F. Schwentker.—p. 171.
*Exchange Transfusion: New Method of Treatment for Erythroblastosis Fetalis. E. S. Platou, W. R. Heilig, R. Bergan and R. B. Tudor. —p. 180.
Quantitative Aspects of Fluid Therapy in Infants and Children. J. A. Anderson.—p. 185.
*Hypoglycemia Associated with Hyperplasia of the Islets of Langerhans: Report of a Case Successfully Treated by Surgery. H. Agustsson, R. B. Tudor and T. C. Chisholm.—p. 190.
Acute Intussusception in Infancy and Early Childhood: Review of 55 Consecutive Cases. O. S. Wyatt and T. C. Chisholm.—p. 193.
*Tracheotomy in Bulbar Poliomyelitis. R. E. Priest and N. F. Goltz. —p. 196.
Nutritional and Psychologic Aspects of Care of Patients with Bulbar Poliomyelitis. A. J. Schroeder.—p. 199.
Observations on a Poliomyelitis Outbreak in North Dakota in 1946: Special Consideration of Spinal Fluid Findings. L. G. Pray.—p. 202.
Apparatus for Relief of Acute Obstructive Laryngitis: Treatment of Fulminating Case Due to H. Influenzae. E. S. Platou, R. Bergan and E. Burklund.—p. 206.
Unusual Causes of Hematuria in Infants and Children. R. B. Tudor. —p. 209.
Paroxysmal Tachycardia in Infancy. E. C. Burke and E. S. Platou. —p. 211.

Exchange Transfusion for Erythroblastosis Fetalis.—Platou and his associates point out that treatment of erythroblastosis fetalis has heretofore been directed primarily at the anemia only. Rh positive blood cells were used, thereby adding "fuel to the fire." Studies have shown that the fate of these Rh positive cells is early hemolysis. Some infants whose livers might tolerate the products of this hemolytic reaction did survive in spite of the added Rh positive cells. Newer knowledge regarding the pathogenesis in erythroblastosis makes liver protection the therapeutic keynote. The procedure described consists in withdrawing an infant's Rh positive cells and maternal antibody and replacing these with safe Rh negative cells and "normal" plasma. Withdrawal and replacement are done through a catheter that is inserted into the umbilical vein. Two cases of impending erythroblastosis fetalis have been treated successfully by the exsanguination transfusion technic. Two similar cases unsuccessfully treated by currently used transfusion technics are presented. The indications were multiparity, previously born erythroblastic babies, rising antibody titer, paternal homozygosity and serologic abnormality in the baby. With these indications prophylactic or early treatment is imperative. Delay has been shown to result in irreparable liver damage. Liver, iron and accessory transfusions of Rh negative cells (suspended in saline solution) are occasionally necessary to combat the aregenerative phase so frequently encountered in these cases in the first few weeks of life. Washed maternal red cells are safe for single accessory transfusion when an Rh negative donor is difficult to find.

Hypoglycemia with Hyperplasia of Islets of Langerhans.—Discussing the multiplicity of types of hypoglycemia, Agustsson and his collaborators point out that while hypoglycemia may be due to the disease of the liver and a number of endocrine glands, it most often occurs with a disturbed secretion of the pancreas. Disease of the aforementioned organs should be ruled out before focusing all attention on the pancreas. Functional pancreatic adenomas and diffuse hyperplasia of the islets of Langerhans seem to be extremely rare in infants and children. The authors report a case of severe hypoglycemia due to overactivity of the islets of Langerhans in a 4½ months old infant, with recovery following a subtotal pancreatectomy. The pathologic specimen showed hyperplasia of the islets of Langerhans. Early diagnosis and treatment are urged to avoid serious neurologic sequelae. The authors accept the first three of the four points advanced by Hartmann as criteria for the need of surgical treatment in hypoglycemia: 1. There should be proof of a persistent or a frequently recurring hypoglycemia by blood analysis. 2. It should be shown that the symptoms expected to be relieved by surgery can be relieved by dextrose administration. 3. It should be shown that the symptoms cannot be relieved by conservative measures of diet regulation.

Tracheotomy in Bulbar Poliomyelitis.—Priest and Goltz analyzed experiences with tracheotomy at the Minneapolis General Hospital during the poliomyelitis epidemic of 1946. Tracheotomy was employed cautiously. Criteria for tracheotomy were (1) respiratory distress as evidenced by recurrent cyanosis, coarse rales in the chest and laryngeal stridor; (2) excitement and unmanageability, causing the patient to resist pharyngeal aspiration strenuously; (3) stupor of a degree sufficient to make the patient oblivious to accumulation of secretion in his airway; (4) inability to cough effectively; (5) pharyngeal pooling of mucus, vocal cord paralysis or intralaryngeal hypesthesia demonstrable by laryngoscopy. Twenty-two tracheotomies were done: 7 patients lived and 15 died. It is thought that the procedure was life saving in 5 cases. Some patients probably died because the operation was performed too late.

New England Journal of Medicine, Boston

236:611-646 (April 24) 1947

*Streptomycin Treatment of Pulmonary Infections: Clinical and Bacteriologic Studies of 6 Cases. H. W. Harris, R. Murray, T. F. Paine and M. Finland.—p. 611.
*Sensitivity to Pork Liver Extract in Pernicious Anemia: Clinical Observations on 14 Patients. J. L. Bauer, R. Janet Watson, J. R. Chambliss and C. S. Davidson.—p. 622.
The Commonwealth's Health Program. V. A. Getting.—p. 626.
Urology. F. H. Colby.—p. 630.
Multiple Polypoid Carcinomas of Stomach, with Metastasis.—p. 634.
Adenocarcinoma of Pancreas, with Liver Metastases.—p. 637.

Streptomycin Treatment of Pulmonary Infections.—The first 3 of 6 patients in whom Harris and his associates resorted to treatment with streptomycin had severe pneumonia, which in 2 cases had failed to respond to penicillin. One of these cases, in which sulfadiazine had been used as a supplement, had a fatal outcome, but in all 3 cases there was bacteriologic evidence of improvement after streptomycin had been started. The 3 remaining cases represent chronic and recurrent bronchopulmonary infections in which gram negative bacilli were found in large numbers in the sputum. The streptomycin was used in these cases in an attempt to reduce the amount of cough and sputum by inhibiting or eliminating the gram negative flora. Each of these patients received a fairly long course of penicillin intramuscularly, and 2 of them also received the antibiotic by inhalation with only partial or temporary relief before streptomycin treatment was started. In 2 cases definite clinical improvement occurred after the streptomycin had been begun. In the other cases there was no improvement in spite of large doses of streptomycin intravenously and by inhalation, and death occurred. One of the causes of clinical failure appears to be the rapid development of streptomycin resistance by the infecting organisms. In 1 case drainage from a chronic suppurative otitis media stopped promptly after systemic and local streptomycin therapy.

Sensitivity to Pork Liver Extract.—Bauer and his associates report observations on 14 patients who acquired sensitivity to a pork liver extract, which was given intramuscularly to about 200 patients during this period. There were 3 varieties of clinical manifestations of sensitivity. The most frequent effect consisted of generalized itching, urticaria, edema of the face and lips, nausea and vomiting. The second type exhibited peripheral vascular collapse, including thready pulse, sweating, cyanosis, weakness and fainting. A third group of patients manifested local signs that may have been due to an Arthus type of sensitivity consisting of swelling, itching and induration without necrosis at the site of injection. The immediate symptoms of sensitivity were relieved at least in part by the injection of epinephrine. Change to an extract derived from beef liver abolished the sensitivity. Skin tests with liver extracts derived from pork, beef and lamb indicated in general greater sensitivity to extract of pork liver than to that of beef and lamb liver. It appeared that the sensitivity to liver extract represented an acquired type of species rather than one of organ specificity.

New Jersey Medical Society Journal, Trenton

44:125-182 (April) 1947

The 181st Annual Meeting of the Medical Society of New Jersey, Haddon Hall, Atlantic City, April 22, 23 and 24, 1947.—p. 126.

44:183-218 (May) 1947

Cancer Program in New Jersey: Essentials in Care of the Cancer Patient. W. O. Wuesten and others.—p. 186.
Rehabilitation Service in New Jersey. J. A. Brodkin.—p. 191.
*Quinidine: A Dangerous Ally. A. D. Dennison Jr.—p. 193.

Quinidine a Dangerous Ally.—Dennison points out that quinidine in overdosage can produce auriculoventricular block, extrasystoles, paroxysmal tachycardia, cardiac standstill from auricular standstill, intraventricular block and ventricular fibrillation. Contraindications to the use of quinidine include idiosyncrasy to the drug, a history of embolism, heart block, old age, congestive heart failure of long standing, great enlargement of the heart and mitral stenosis. The following are accepted indications for quinidine treatment: auricular fibrillation of less than three months' duration, paroxysmal ventricular tachycardia, episodes of auricular paroxysmal tachycardia and extrasystoles, particularly those arising in the auricle. Prophylactically it can be used in coronary thrombosis to prevent ventricular paroxysmal tachycardia and ventricular fibrillation. Occasionally it is indicated in auricular flutter.

Occupational Medicine, Chicago

3:225-334 (March) 1947

Industrial Health. S. J. Seeger.—p. 225.
Problems of Shallow Water Diving: Report Based on Experiences of Operational Swimmers of Office of Strategic Services. C. J. Lambertsen.—p. 230.
Recent Experiments in Medical Service for Small Plants. F. E. Poole.—p. 247.
Recent Experiments in Medical Service for Small Plants. L. Arling.—p. 251.
Health Service in Small Plants. N. Millman.—p. 257.
Review of 10,834 Preplacement Physical Examinations in Wartime Industry. Jean Spencer Felton.—p. 261.
Paracelsus: Founder of Occupational Medicine. W. K. Frankel.—p. 288.
Cardiac Tamponade Caused by Industrial Injury: Report of a Case. F. F. Boys.—p. 300.

Ohio State Medical Journal, Columbus

43:337-452 (April) 1947

*Penicillin Treatment of Gonorrhea in Female: Study of Time-Dose Ratio. A. C. Barnes and R. F. Daly.—p. 369.
Recent Research in Allergy. J. H. Mitchell.—p. 372.
Present Status of Cancer Research. S. P. Reimann.—p. 375.
Subarachnoid Hemorrhage. J. T. Bakody.—p. 381.
Relationship of Gynecology to Obstetrics. R. E. Krigbaum.—p. 384.
*Evaluation of Treatment of Primary Pneumococcic Pneumonia. R. T. Thompson.—p. 388.
Prevention of Rheumatic Fever in Children by Use of Sulfonamides. R. A. Lyon, Louise W. Rauh and R. E. Wolf.—p. 394.

43:453-572 (May) 1947

Can Military Medical Education Offer Any Features Applicable to Civilian Professional Instruction? T. E. Rardin and N. B. Reicher.—p. 485.
Treatment of Uterine Prolapse Syndrome by Spalding-Richardson Composite Procedure. R. C. Austin.—p. 490.
Nonsyphilitic Lesions of Penis. I. L. Schonberg.—p. 498.
Penicillin—Indications and Methods of Administration. R. F. Parker.—p. 501.
Readjustment of Handicapped Veteran. W. C. Menninger.—p. 504.

Penicillin for Gonorrhea in the Female.—Barnes and Daly regard two considerations as fundamental in the search for the ideal form of penicillin therapy: (1) the percentage of cures, (2) the applicability of the chosen schedule to the nature of the practice and to the type of patient. Since a considerable number of patients treated by the authors are indifferent to and/or apprehensive of treatment, it has been felt imperative to achieve all therapy in one clinic visit. Sodium penicillin in aqueous solution (with 0.25 per cent procaine) has been used. Schedule A consists of 100,000 Oxford units given in five injections of 20,000 Oxford units each at two hour intervals. The elapsed time on such a program is eight hours. Schedule B consists of the same time schedule but double the amount of penicillin. Forty thousand Oxford units was given in each injection at the two hour intervals. Schedule C consists of three injections at two hour intervals. In the first injection 50,000 units is given in each buttock for a total initial dose of 100,000, followed by two 50,000 Oxford unit injections at two hour intervals. The same total unitage is achieved as in schedule B, but the elapsed time is only four hours. It was found that the shortening of the time schedule from eight to four hours resulted in a loss of almost 10 per cent effectiveness (90 per cent to 80.7 per cent) even though the dosage remained constant.

Evaluation of Treatment of Pneumococcic Pneumonia.—Thompson evaluates the treatment of 189 cases of primary pneumococcic pneumonia with sulfamerazine to indicate where sulfonamides have been inadequate in the management of pneumococcic pneumonia and to emphasize that the great majority of patients who die of pneumococcic pneumonia are above 40 years of age. Patients who die usually have cardiac or renal disorder prior to death, and many patients respond to treatment for pneumonia but die of some latent disorder which may have been aggravated by the acute illness. Twenty-three of the 189 patients had an elevation of the blood urea nitrogen above 40 mg. per hundred cubic centimeters; 14 recovered and 19 died. Fourteen of the patients who died had elevation of blood urea nitrogen on admission, before sulfamerazine was started. Only 1 fatality could be ascribed to the treatment. A method of assessing therapeutic efficacy is discussed and is mainly a matter of defining treatment failure. Sulfamerazine was found a safe and efficacious remedy.

Oklahoma State Medical Assn. Jour., Oklahoma City

40:117-178 (April) 1947

The Overweight Obstetric Patient, with Special Reference to Use of Dexedrine Sulfate. J. W. Finch.—p. 117.
Choice of Carbohydrates Used in Artificial Feeding of Infants. C. J. Alexander.—p. 122.
Infectious Mononucleosis: Benign Lymphadenosis or Glandular Fever. W. H. Kaeiser.—p. 125.
So Your OB Is Rh Negative? L. G. Livingston.—p. 130.
Epidemic Diarrhea of the Newborn. H. W. Buchner.—p. 132.

40:179-216 (May) 1947

The Cardiac in Pregnancy. F. R. Hood.—p. 181.
Chronic Rhinitis. R. W. Rucker.—p. 184.
Pilonidal Cysts and Sinuses. B. J. Cordonnier.—p. 186.
Staphylococcus Ulcer of Cornea. W. W. Mall.—p. 190.

Pennsylvania Medical Journal, Harrisburg

50:681-776 (April) 1947

Pregnancy Complicating Diabetes. Priscilla White.—p. 705.
Glaucoma Clinic: Its Need, Organization and Early Growth. J. G. Linn.—p. 709.
"Adequate" Diphtheria Immunization in a Community. E. Eichelberger.—p. 712.
Primary Carcinoma of the Ureter. S. L. Grossman and R. E. Allyn.—p. 715.
Recent Advances in Syphilologic Diagnosis and Treatment: Nonspecific Positive Serologic Test and Use of Penicillin. J. H. Stokes.—p. 718.
Delayed Ligation of the Umbilical Cord. G. N. Ballentine.—p. 726.
Common Misconceptions of Ocular Disturbances in Children. R. C. Lanciano.—p. 729.

Physiological Reviews, Baltimore

27:167-334 (April) 1947

The Nature of Pain. H. G. Wolff and J. D. Hardy.—p. 167.
Heat: Man's Exchanges and Physiologic Responses. W. Machle and T. F. Hatch.—p. 200.
Definition and Meanings of p_H. A. G. Ogston.—p. 228.
Review of Physiologic and Psychologic Studies of Sexual Behavior in Mammals. F. A. Beach.—p. 240.
Recent Advances in Study of Biologic Competition Between Structurally Related Compounds. D. W. Wooley.—p. 308.

Public Health Reports, Washington, D. C.

62:597-628 (April 25) 1947

*Control of Houseflies by DDT Sprays. W. C. Baker.—p. 597.
A Mobile, Collapsible Laboratory and Field Table. G. D. Clayton.—p. 613.

Control of Houseflies by DDT Sprays.—Baker and his associates investigated milk and food establishments. In dairies a 2.5 per cent DDT-xylene Triton emulsion was used at the rate of 200 mg. of DDT per square foot. A complete treatment of both barn and outbuildings usually gave satisfactory control for three months or more. In restaurants a 7.5 per cent emulsion was applied to the ceiling and walls of dining rooms

and kitchens at the rate of 200 mg. of DDT per square foot. Excellent control was obtained for three or more months in the restaurants treated. In small food and ice cream shops, 40 to 60 feet of DDT-impregnated cord hung as a replacement for electric light pull cords, along the chains of suspended display shelves and from ceilings at locations where the cord would be accessible to the flies gave good control when fly populations were not excessive. In shops with a great influx of flies, the treated strings did not bring the flies under satisfactory control.

Puerto Rico J. Pub. Health & Trop. Med., San Juan

22:235-328 (March) 1947

Low Incidence of Enterobius Vermicularis in Natives of Guam. N. R. Stoll, B. M. Chenoweth Jr. and J. L. Peck Jr.—p. 235.
Intradermal Reactions to Fresh and Stored Antigens Prepared from Cercariae of Schistosoma Mansoni. Caroline K. Pratt and J. O. Gonzalez.—p. 254.
Relation of Brucellosis to Human Welfare. I. F. Huddleson.—p. 260.
Ponce Malaria Control Project. A. H. Neill.—p. 292.
Schistosomiasis Mansoni in the Republic of Santo Domingo: Report of 6 Cases. A. M. Ponce Pinedo.—p. 308.

Rocky Mountain Medical Journal, Denver

44:345-432 (May) 1947

Medical Care of the Veteran. P. R. Hawley.—p. 363.
Some Public Relations Opportunities for Colorado Doctors. R. T. Rich.—p. 367.
Differential Diagnosis and Treatment of Neuralgia of Face. A. W. Adson.—p. 371.
Newer Developments in Pathogenesis and Treatment of Hypertension. W. Dock.—p. 372.
Value of Stained Vaginal Smear in Gynecologic Diagnosis. H. F. Traut.—p. 376.
Relationship and Practical Application of the Rh and Hr Factors. G. A. Matson, M. S. Sanders and J. R. Wherritt.—p. 380.

Surgery, Gynecology and Obstetrics, Chicago

84:891-1017 (May) 1947

Treatment of Trichomonas Vaginalis Vaginitis. W. J. Reich, Helen L. Button and M. J. Nechtow.—p. 891.
Extensive Hemangioma: Report of Cases. D. C. Elkin and F. W. Cooper Jr.—p. 897.
Choice of Operation for Treatment of Arteriovenous Fistulas. E. C. Heringman.—p. 903.
Action of Urea and Some of Its Derivatives on Bacteria: Effect of Mixture of Urethane and Sulfanilamide on Bacterial Flora of Infected Wounds in Man. C. W. Howe and L. Weinstein.—p. 913.
*Gelatin Solution in Treatment of Shock from Graded Hemorrhage. S. O. Levinson, Martha Janota, F. Arimoto and H. Necheles.—p. 925.
*Circumscribed Chronic Suppurative Mastitis Simulating Cancer. H. K. Tuttle and B. H. Kean.—p. 933.
Comparison of Suture and Nonsuture Methods for Anastomosis of Veins. T. N. P. Johns.—p. 939.
Origin and Development of Erect Posture. C. A. Splithoff.—p. 943.
*Malignant Lymphoma: Value of Radical Surgery in Selected Cases. C. A. Hellwig.—p. 950.
Digestion of Living Tissue by Hyperacid Stomach: Experimental Study. P. B. Price and T. F. Lee.—p. 959.
Adolescent Primigravida. H. E. Schmitz and Janet E. Towne.—p. 962.
Results of Treatment of Epidermoid Carcinoma of the Anus and Rectum. R. H. Sweet.—p. 967.
Management of Jaw Fractures. L. T. Barclay, S. D. Gordon and H. H. Campbell.—p. 973.
Surgery of Posterior Interosseous Branch of the Radial Nerve: Analysis of 58 Cases. J. H. Mayer Jr. and F. H. Mayfield.—p. 979.
Histopathology of Gastric Semisquamous Epithelial Layer. F. Duran-Jorda.—p. 983.
Notes on History of Resuscitation in Mediterranean Theater of Operations. H. K. Beecher.—p. 989.

Gelatin Solution in Shock.—Levinson and his associates studied the efficacy of gelatin solutions in the treatment of hemorrhagic shock. Various brands of gelatin, gelatins with different degrees of hydrolysis and various concentrations of gelatin solutions were tried. On the basis of their experiences on dogs they recommend gelatin solution for use on patients. Gelatin cannot replace whole blood, nor is it a substitute for plasma, but it has value as an inexpensive, easily available agent to combat shock due to plasma loss. Experience with the use of gelatin solution on patients has been favorable.

Circumscribed Chronic Suppurative Mastitis Simulating Cancer.—Tuttle and Kean observed in a woman aged 44 a hard nodular mass adherent to the overlying skin, with typical peau d'orange and retracted nipple accompanied by enlarged, hard, nontender, homolateral axillary lymph nodes. A diagnosis of carcinoma of the breast and axillary metastases was made and a radical mastectomy was done. This revealed a hard, circumscribed, unencapsulated mass filled with thick, yellowish green pus. During the following years this type of lesion was observed at fairly regular intervals and in numerous instances presented great difficulty in differentiation from carcinoma of the breast. All breast tumors removed at Gorgas Hospital between 1920 and 1945 were reviewed and a total of 32 cases of chronic suppurative mastitis were selected for study. Its relative incidence as compared with carcinoma was approximately 1 to 5. Simple incision and drainage is a poor operation for this disease. The best surgical treatment for a patient with a tumor of the breast in which the differential diagnosis rests between cancer and circumscribed chronic suppurative mastitis is as follows: First decide whether the tumor mass alone or the entire breast is to be removed, then proceed with the excision or simple mastectomy. The tumor or breast should be immediately sectioned on a separate table. Examination of the tumor at this time will solve the problem in most instances. The tumor should not be incised in situ; pus, if present, will contaminate the entire wound and may prolong the convalescence. If this procedure is followed, patients with this benign lesion may be spared radical treatment, whereas those with malignant tumors will not be deprived of the full diagnostic and surgical efforts required in the treatment of cancer.

Malignant Lymphoma.—Hellwig says that in the course of two decades he observed that patients with malignant lymphoma occasionally lived five years and longer after surgical removal of a single tumor. This discrepancy between occasional long survival periods after operation and the discouraging view of most surgeons regarding malignant lymphoma prompted him to review 234 cases of malignant lymphoma. Analysis of 130 cases with complete clinical records followed for a sufficient length of time to be of value revealed a close correlation between the histology and life expectancy. The average duration of disease was 26.7 months. It varied in the different histologic types between 3 months and 4.8 years. Radiation therapy may occasionally save a life when the tumor is located in a vital part of the body inaccessible for surgery, but it will seldom prolong the life expectancy inherent in the histologic type of lymphoma. Early surgical removal of a primary focus of disease offers the best chance of cure in malignant lymphoma. Of 21 patients who received radical surgery for a single primary focus, 12 survived for from five to twenty years.

Virginia Medical Monthly, Richmond

74:195-240 (May) 1947

Review of Some Past and Present Types of Psychiatric Therapy. J. R. Saunders.—p. 295.
Obscure Hematemesis: Gastroscopy, an Aid in Its Diagnosis. C. M. Caravati and J. M. MacMillan.—p. 200.
Acanthosis Nigricans—Case of Benign Type in 8 Year Old Girl. W. H. Kaufman and D. C. Smith.—p. 204.
Today's Challenge. R. B. Smith Jr.—p. 208.
Electrocardiographic Changes Occurring During Antimony Therapy. G. B. Craddock and E. C. Toone Jr.—p. 210.
Primary Cancer of Lung. F. P. Coleman.—p. 215.
Office Gynecology. P. T. Grove.—p. 223.
Mortality from Coronary Disease by Age, Sex and Race. J. B. Nichols.—p. 225.
Repair of Posterior Vaginal Hernia from Below, Without Opening Sac: Report of Case. C. I. Sease.—p. 227.

Wisconsin Medical Journal, Madison

46:389-484 (April) 1947

Some Points in the Radiologic Diagnosis of Diseases of Bones and Joints. S. A. Morton.—p. 403.
Fractures of the Wrist and Ankle. L. V. Littig.—p. 407.
Amebic Abscess of the Liver. F. Raine.—p. 409.
The Physician and Tuberculosis. J. A. Myers.—p. 412.
Treatment of Malaria. M. Hardgrove and J. B. Brown.—p. 420.

46:489-576 (May) 1947

Maintenance of Adequate Respiratory Exchange. R. M. Waters.—p. 507.
Antibiotic Substances in Pediatrics. R. L. J. Kennedy and W. E. Herrell.—p. 509.
Primary Considerations in Retinal Detachment, Based on a Review of 104 Cases. P. A. Duehr.—p. 515.
Chronic Cervicitis: Analysis and Treatment on Basis of Over 2,000 Cases. W. J. Reich and M. J. Nechtow.—p. 520.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Surgery, Bristol

34:225-332 (Jan.) 1947

Dysplasia Epiphysialis Multiplex. T. Fairbank.—p. 225.
Sarcoma in Abnormal Bones. H. Platt.—p. 232.
Needle Biopsy in Clinical Diagnosis of Tumors. F. Ellis.—p. 240.
*Renal Anoxia and Traumatic Uremia Syndrome. E. M. Darmady. —p. 262.
Osteitis Pubis After Suprapubic Operations on Bladder: Report of 10 Cases. E. Kirz.—p. 272.
Razor Blade in Esophagus: Transthoracic Removal. T. H. Sellors. —p. 276.
*Chorioncarcinoma of the Testis with Gynecomastia: Report of a Case with Early Breast Cancer. A. Lyall.—p. 278.
Arnold-Chiari Malformation. G. H. Steele.—p. 280.
Transformation of an Embryonic Lipoma to a Common Lipoma. D. P. Van Meurs.—p. 282.
*Massive Hemorrhage from Peptic Ulcer in Meckel's Diverticulum in Female Child of Eleven Months. R. W. Wilkinson.—p. 285.
Amebic Granuloma of Skin. I. Norwich and D. A. Muskat.—p. 287.
Tooth Plate Impacted in Gullet for Fifteen Years: Removal by Transthoracic Esophagotomy. G. G. Turner.—p. 290.
Carotid Body Tumors. H. M. Goldberg.—p. 295.
Surgical Treatment of Hydrocephalus: Simple Method of Performing Third Ventriculostomy. H. F. McNickle.—p. 302.
Cerebral Thromboangiitis Obliterans. L. Davis and G. Perret.—p. 307.

Renal Anoxia and Traumatic Uremia Syndrome.—Darmady found 44 deaths among 10,000 casualties admitted to a casualty clearing station in England, and of these 12 were due to renal failure. Details of the first 6 of these fatal cases were published, as well as of the 2 cases in which renal failure was recognized clinically and in which recovery occurred. The present report deals with a further 6 cases of fatal traumatic uremia and 3 more cases of uremia with recovery. The etiologic factors and the similarity to other conditions have led to the conclusion that the ultimate cause of death is renal anoxia. The mechanism of the production of renal anoxia by alteration of the blood supply to the kidney by vasospasm is suggested. The dangers of overalkalization and possible help through splanchnic block are brought forward.

Chorioncarcinoma of Testis with Gynecomastia.—A soldier aged 24, whose left testis had been removed two and one half months previously for a tumor, had made a good recovery from the actual operation, but for a few weeks previous to his admission he had been losing weight and had noticed that his breasts were becoming tight and swollen. The condition of the patient rapidly deteriorated, secondary tumors appeared, and he died five weeks after admission. Tumors of the lungs, liver, kidney and para-aortic glands were sectioned and examined by various staining methods. Various sections from both breasts were also examined. The tumors had the typical microscopic appearance of chorioncarcinoma. Lyall regards the presence of early carcinoma in the hyperplastic breast as the most interesting feature of this case.

Hemorrhage from Peptic Ulcer in Child.—Wilkinson reports the occurrence of peptic ulcer in a Meckel's diverticulum in a girl aged 11 months. Complete recovery followed removal of the diverticulum.

British Medical Journal, London

1:587-626 (May 3) 1947

*Folic Acid as Therapeutic Agent. L. S. P. Davidson and R. H. Girdwood.—p. 587.
Physical Health of Children Attending Day Nurseries: Report to the Day Nurseries Committee of the Medical Women's Federation. Margaret E. McLaughlin.—p. 591.
*Potassium Thiocyanate in the Treatment of Hypertension. G. Watkinson and G. Evans.—p. 595.
*Autohemagglutination and Raynaud's Phenomenon. G. B. Forbes. —p. 598.

Folic Acid as Therapeutic Agent.—Employing folic acid in various types of blood dyscrasias, sprue and colitis, Davidson and Girdwood found that a hemopoietic response was obtained only in cases in which the bone marrow was megaloblastic, that is, in pernicious anemia, refractory megaloblastic anemia and sprue. No therapeutic changes were obtained in cases of aplastic anemia, leukopenia or thrombocytopenia. Folic acid controlled the diarrhea and produced general clinical improvement in adults with tropical sprue and idiopathic steatorrhea, but by itself it seldom restored the blood level or blood picture to normal. In none of the cases of celiac disease was any hematologic or clinical improvement noted. The clinical and sigmoidoscopic appearances in 5 cases of idiopathic ulcerative colitis were unaffected by folic acid therapy.

Potassium Thiocyanate for Hypertension.—Watkinson and Evans think that the differences of opinion regarding the value of potassium thiocyanate are due (1) to the narrow margin that exists on occasion between the therapeutic and the toxic dose of the drug, as also to the fact that a toxic rash may appear when the drug concentration in the blood is at a low level, and (2) to the fact that the coincidental arteriosclerotic disease is not as yet either recognized or understood. They review observations on 60 patients with persistent hypertension. They place the patient at rest in bed for the first fortnight or three weeks with symptomatic treatment. After the effect of this treatment on general well-being and blood pressure has been noted, potassium thiocyanate is given for from four to ten days if indications for its use are still present. At the end of one week's treatment the serum thiocyanate concentration is estimated. The quantity of potassium thiocyanate administered should be based on serum estimations. Blood pressure readings are no criterion of dosage. A scheme of dosage is given together with indications for treatment. Symptomatic relief and a significant fall in blood pressure were observed in roughly 60 per cent of the cases. The further observations of 42 patients show that the effect of thiocyanate therapy can be correlated with the phases of the arteriosclerotic process, and that whereas symptomatic relief is given and blood pressure reduction is maintained in approximately 40 per cent of the cases, the continued administration of potassium thiocyanate does not prevent the continued progress of arteriosclerotic disease.

Autohemagglutination and Raynaud's Phenomenon.—Forbes tells of an American sergeant aged 24 who was admitted to the hospital with the complaint that his fingers became blue and numb on exposure to cold environmental conditions. During the patient's stay in the hospital the weather became warmer and attacks did not develop spontaneously. It was possible to induce an attack by immersing the patient's hands in cold water. That the patient was an "autoagglutinator" was first suspected when an attempt was made to do a blood count. Capillary blood issuing from a small puncture wound in the lobe of the ear was seen to agglutinate spontaneously. It was impossible to carry out an accurate blood count, but by warming the patient's ear with a hot water bottle and using pipets and diluting fluids which had been warmed to 37 C., agglutination was temporarily prevented and a reasonably accurate blood count obtained. It was shown that the abnormal agglutinin in the patient's serum was a true autohemagglutinin, but the factor responsible for its presence was not determined. The fact that no abnormality was detected on examinations of the chest does not altogether exclude the possibility that he had had a subclinical attack of primary atypical pneumonia, a disease which was encountered among service personnel in northwestern Europe at the time of his admission. It is suggested that the Raynaud-like attacks which followed exposure of the patient's extremities to low temperatures resulted from blockage of the small peripheral vessels with corpuscular aggregations.

Medical Journal of Australia, Sydney

1:385-416 (March 29) 1947. **Partial Index**

Treatment of Acute Perforation in Peptic Ulcers. A. J. Trinca.—p. 385.
Recent Observations in Uric Acid. A. Bolliger.—p. 394.
Pericarditis and Pericardial Adhesions. J. B. Cleland.—p. 396.

1:417-448 (April 5) 1947

Value of Cold Pressor Test in the Prediction of Hypertension and Toxemia in Pregnancy. Vera I. Krieger and Sara Weiden.—p. 417.
Undergraduate and Postgraduate Education in Physical Medicine. H. Crawford.—p. 423.
Cross Infection of Wounds in Surgical Ward During Trial of Use of Oiled Blankets. Phyllis M. Roumtree.—p. 427.
Nutritional Deficiency Diseases. G. B. Hall.—p. 430.

Bruxelles-Médical, Brussels

27:1021-1080 (May 11) 1947

*Treatment of Arterial and Venous Infections with Penicillin. A. Bernard. —p. 1031.
So-Called Medical Exercises in Face of Medicine: Problem of Scoliosis. P. V. Dupuis.—p. 1041.
Rare Case of Intrathoracic Foreign Body. L. Mayer.—p. 1048.

Penicillin in Arterial and Venous Infections.—Bernard administered penicillin to 3 men between 33 and 50 and 2 women aged 54 and 63 with phlebitis, 1 man aged 57 with coronary arteritis and 1 woman aged 52 with coronary panarteritis. The total dose varied between 500,000 and 2,500,000 units. The temperature was restored to normal in thirty-six to forty-eight hours. The penicillin therapy should be continued for at least five additional days or even longer to prevent a recurrence. Drop in temperature was associated with a decisive improvement in general phenomena even in the case of severe polyarteritis. Penicillin therapy is useful in infection which causes spread of the inflammation of the vessels along the intima and by embolism. Continuation and spread of the disease may be prevented by sterilizing the blood and by maintaining asepsis of the blood. The formation of new emboli may be avoided, and new foci resulting from embolism in other organs and vessels may become disinfected. Penicillin is effective not only in thrombosis of large vessels but also in inflammation of coronary vessels. Penicillin does not effect the absorption of the clot, which requires the same length of time as when penicillin is withheld.

Presse Médicale, Paris

55:213-228 (March 29) 1947

*Mechanism and Consequences of Accumulation of Dust in Bronchial and Arterial Sheaths in Course of Pneumonoconiosis. A. Policard.—p. 213.
Intersympathoparasympathetic Mechanism in Terminal Organ. D. Danielopolu.—p. 214.
Prophylaxis of Radiodermatitis Associated with Roentgen Diagnosis. R. Coliez and Y. L. Crehalet.—p. 215.
Peritonitis Encapsulans: Personal Observations. J. Charles.—p. 216.

Pneumonoconiosis.—According to Policard, inhaled dust particles are phagocytosed in the alveoli. Dust loaded cells pass into the conjunctival spaces of the sheaths and into the lymphatics. They block the lymphatics, and edema of the sheaths results. Segmentary fibrosis of the sheaths may be partly due to collagen fibers and partly to reticulin fibrillae. The more or less fusiform thickening of the peribronchial and perivascular sheaths explains the existence of nodules in the lung, which must be distinguished from the silicotic nodules, since they do not contain hyaline fibers and cannot be detached easily from the surrounding tissue. Phosphocalcareous impregnation of the sheaths rather than calcification results from the accumulation of mineral dust, since the carbonate of lime is neither solid nor crystalline but is a combined molecular substance of protein complex, causing radiopacity of the sheath. The conjunctival layer of the sheaths loses its normal elasticity with consequent embarrassment of the respiratory movements, causing dyspnea. The dust particles interfere directly with the nutrition of the arterial wall, causing periarteritis, and accumulation of dust in the peribronchial sheaths is responsible for an indirect disturbance of the nutrition of the wall of the adjacent pulmonary artery. Sclerosis of pulmonary areas results from progressive obliteration of pulmonary arteries, and atelectasis results from progressive obliteration of the bronchi.

Gynaecologia, Basel

123:1-72 (Jan.) 1947

Diagnosis of Cancer of Female Genitalia. D. Gadola.—p. 1.
Pelvic Kidney. B. Gondos.—p. 33.
*Streptococcic Sepsis in a Newborn Infant Whose Mother Had Mastitis During Pregnancy. M. Fukas.—p. 53.
Rupture of Membrane Before Onset of Labor. E. Tonkes.—p. 58.

Streptococcic Sepsis of a Newborn Infant Whose Mother Had Mastitis During Pregnancy.—Fukas reports the history of a male infant who developed symptoms on the third day of life and who died on the fifth day of streptococcic septicemia. Necropsy corroborated the diagnosis. The mother had had mastitis of the left breast for two months before her confinement. It is assumed that streptococci were transmitted to the infant in utero by way of the blood stream. The general infection developed after the antibodies derived from the mother had been exhausted.

Arch. Urug. de Med., Cir. y Especial., Montevideo

29:429-590 (Nov.-Dec.) 1946. **Partial Index**

*Traumatic Intracerebral Hematoma: Cure After Operation. E. Vigil Sóñora.—p. 528.
*Tuberculosis of Mamma. A. Pou de Santiago.—p. 566.

Traumatic Intracerebral Hematoma.—An adult showed signs of cerebral injury twenty-four hours after having sustained cranial trauma. Diagnosis of intracerebral hematoma was made on evidence presented by encephalography, namely the displacement of the pineal body and of the left ventricle. The operation consisted in evacuation of hematoma near the ventricle. One week later the cerebral symptoms reappeared. Encephalography showed reformation of the hematoma, which on this occasion was drained by aspiration, resulting in final cure of the patient.

Tuberculosis of Breast.—Pou de Santiago reports the occurrence of primary tuberculosis of the breast in 3 adult women. In 1 of the patients the clinical diagnosis was confirmed by the results of the roentgen examination of the canalicular system of the breast by Leborgne's method. The therapy consisted in surgical removal of the breast and the general therapeutic regimen.

Revista Medica de Chile, Santiago

75:151-216 (March) 1946. **Partial Index**

*Paralytic Inguinal Hernia. R. Zúñiga Latorre.—p. 195.

Paralytic Inguinal Hernia.—This condition, a relatively frequent complication of appendectomy, has not been previously described. It is due to paralysis of the muscles of the inguinoabdominal region caused by lesions to nerves during the operation. The nerve lesion manifests itself by a permanent neuralgia following the operation and with later formation of an inguinal hernia. Prevention consists in avoiding injury to the nerves. The treatment of the condition requires freeing the nerves from the scar and the performance of a Bassini herniotomy employing a pedicle of fascia from the patient's own larger oblique muscle. Seven cases are reported.

Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam

91:789-844 (April 5) 1947

Treatment of Agranulocytosis. W. H. Borst.—p. 796.
Dicrotism of Pulse. A. A. van der Kroon.—p. 801.
*Gonorrheal Peritonitis in Upper Part of Abdomen. L. W. van Ravesteyn. —p. 808.
*Acute Pancreatitis as Complication of Epidemic Parotitis. J. J. Spittuler. —p. 814.

Gonorrheal Peritonitis.—The first of the 2 patients presented by van Ravesteyn was a woman aged 29 who suddenly developed signs of peritonitis in the upper abdomen on the right side. The patient had gonorrhea and an old salpingitis. The symptoms, which were diagnosed as gonorrheal perihepatitis, were counteracted by 160,000 units of penicillin administered by eight intramuscular injections in the course of a day. The symptoms of the second patient were counteracted by 200,000 units of penicillin. Discussing the various clinical pictures that can be produced by the gonococcus within the peritoneum, Ravesteyn points out that gonorrheal perihepatitis was described as a separate entity by Stajano in 1920. Trauma in the form of surgery, gynecologic examination, coitus or irrigation may be etiologic factors. The differential diagnosis must consider cholecystitis, pyelitis, nephrolithiasis, appendicular subphrenic abscess, pneumonia of a lower lobe and extrauterine pregnancy.

Acute Pancreatitis as Complication of Mumps.—In the course of an epidemic of mumps in 1946 it was realized that mumps is not as harmless a disorder as it is generally assumed to be. Spittuler reports that a boy aged 8 exhibited the symptoms of acute pancreatitis with high fever, severe pain in the epigastrium and in the left hypochondrium with radiation toward the back and vomiting. The symptoms subsided in five days. Pancreatitis usually develops about a week after the parotid swelling, but it may also precede it. Examination of the urine for the presence of sugar is advisable for some time after the recovery of the patient.

Book Notices

The Philosophy of Insanity. By a Late Inmate of the Glasgow Royal Asylum for Lunatics at Gartnavel. With an Introduction by Frieda Fromm-Reichmann, M.D. Cloth. Price, $2.50. Pp. 116. Greenberg, Publisher, 201 E. 57th St., New York 22, 1947.

This remarkable autobiographic commentary was written in 1860 by an anonymous recovered psychotic patient. Dr. Fromm-Reichmann, interested in exposing the thesis that the psychologic experiences and modes of expression of psychotic, neurotic and "so-called normal" individuals differ not in kind but in degree, has uncovered this work, which offers impressive support to her thesis. While the author, a layman, reflects in his writing a number of the misconceptions current to the psychiatric thinking of his time, his concept of mental disorder is in great measure in keeping with modern thinking. He insists that "the line that separates sanity from insanity is invisible, and there are as many kinds and degrees of the disease as there are sufferers."

The description of the delusional mental state during recovery from a manic attack has the peculiar quality dependent on the intense suffering experienced by the writer. His remarks on the care of the insane, his discussion of popular misunderstanding about the nature of mental disorder and the stigmatization of the mentally ill might appear in a present day publication. His discussion of qualifications of hospital attendants for the insane and standards of pay should be read by the legislators who provide funds for our public institutions for care of the mentally ill. The author's personal experience in Gartnavel indicates a very high order of care for the patients in this institution nearly a hundred years ago.

The incisive, at times epigrammatic, style of writing reflects the author's sharp perspective and deep feeling about the sufferings created by the distortions of the mentally ill. "There is nothing more wicked than virtue out of its wits, nothing more cruel than humanity run mad. . . . Nothing assimilates man more closely to the fiend than religious fanaticism."

In the discussion of bodily and mental health, says the writer, "In every description of sickness and pain which afflict the body the mind is a participator"; so it appears that psychosomatic concepts have a long history. This book is well worth the reading time of every physician and medical student.

Éducation physique, sports et tuberculose pulmonaire. I. La tuberculose des sportifs. II. La prophylaxie de la tuberculose pulmonaire par les exercices physiques. III. La gymnastique et les sports dans le traitement de la tuberculose pulmonaire. Par le Docteur Pierre Weiller. Paper. Pp. 320, with 31 illustrations. Vigot Frères, 23 rue de l'École-de-Médecine, Paris 6e, 1946.

This volume is devoted to pulmonary tuberculosis as it occurs in persons engaged in physical education and athletics. The author, having been an athlete himself, became interested in this subject, and, having been the physician of several societies of physical education and sports, he had an unusual opportunity to observe tuberculosis among those engaged in these activities. The histories of 207 cases are reported. The author is particularly interested in determining what part athletics plays in the development of pulmonary tuberculosis. This he found extremely difficult. For example, in one person who held a regular position engaged in several sports during his spare time the question was whether his tuberculosis was due to the regular job or to the sports. A boxer who became indignant because he had been defeated in a match began to lose weight, to cough and to develop serious pulmonary tuberculosis. All cases in which tuberculosis developed in athletes in whom he thought some such circumstance might have precipitated the disease, rather than the sports, were eliminated.

One hundred and forty-six cases are presented which the author considers valuable from the point of view of athletics having played a role in the development of the disease. Twenty-seven cases occurred among professionals in physical education and athletics. Therefore the author points out that tuberculosis does not respect such persons. The average age of these patients was from 30 to 35 years. With two exceptions the disease was of long standing—from four to fifteen years. The author states that the impression one gets from the study of pulmonary tuberculosis among the professional sportsmen is that it is a slowly progressive disease. He warns that they must be kept under the close observation of the physician, as the disease in some of them becomes contagious and may contaminate their colleagues.

One hundred and nineteen cases of tuberculosis among amateur athletes are presented. Therefore it is strongly recommended that adequate examinations be made periodically of every amateur. From a description of these 119 cases it becomes apparent that they do not seem to be significantly different from those which one regularly sees drawn from the general population. The treatment administered, both among the professional and among the amateur athletes, is discussed in considerable detail, and a number of x-ray reproductions are presented to show lesions before and after treatment.

The second part of the book is devoted to the prophylactic value of physical education and athletics in pulmonary tuberculosis. The author believes that much tuberculosis can be prevented by certain technics in this field. Part three consists of a discussion of physical education and athletics in the treatment of pulmonary tuberculosis. Along with the benefits which he thinks may be accomplished he calls attention to certain dangers.

The Preservation of Proteins by Drying, with Special Reference to the Production of Dried Human Serum and Plasma for Transfusion. By R. I. N. Greaves. Medical Research Council Special Report Series No. 258. Paper, 2s. Pp. 54, with 25 illustrations. His Majesty's Stationery Office, York House, Kingsway, London, W. C. 2, 1946.

Increasing use of proteins in biologic research and their rapid adoption in therapy have focused attention on the problems concerned with the handling of proteins. If protein preparations are to have a wide clinical use distribution must be made in a convenient and stable form which permits adequate standardization and insures reproducible results. A notable contribution to this requirement is the development of methods for reducing proteins to the dry state with a minimum of alteration in chemical or biologic properties. This book presents the application of vacuum drying from the frozen state to the problem of protein preservation. The author has made important contributions to the field and presents here the results of his own research together with the application to the large scale drying of human serum and plasma during the past six years in England. He reports on the drying of over 350,000 units of plasma and serum, from June 1940 to September 1945 with an overall loss of less than 0.5 per cent. The historical review will be valuable to those who are interested in the development of vacuum drying. Probably by necessity it omits some of the more recent developments in the United States; although many of them are related to large scale drying of penicillin, they are directly applicable to the drying of proteins. Although most of the theory of the kinetics of vacuum systems is omitted, the experiments, observations and practical applications recorded represent a contribution to a field in which opinions are still more numerous than the results of controlled experiments.

A History of Scientific English: The Story of Its Evolution Based on a Study of Biomedical Terminology. By Edmund Andrews, M.D. Cloth. Price, $7.50. Pp. 342, with 18 illustrations. Richard R. Smith, 20 E. 39th St., New York 16, 1947.

This book was written by a surgeon of the first rank, a scholar of broad interests and a gentleman of character, attributes that might be anticipated in the son of E. Wyllys Andrews and the grandson of Edmund Andrews. When Dr. Edmund Andrews died late in 1941 he had completed the manuscript which has now been published. Arno Luckhardt has written a foreword in which he admits that he put off reading the bulky manuscript for some time, particularly since the title did not portend exciting reading. But the perusal of the first few pages sufficed to impel him to continue the task with growing enthusiasm. Actually the book affords delightful reading and, while quite advanced and thorough in all that pertains to the knowledge of philology, its breadth, the versatility of its approach, the wide sweep of the correlations, the skilful blending of personal observation and knowledge with accepted fundamentals of the science of words all contribute to make this an unusually interesting book.

It is fortunate that the professional life of the author centered about medicine and surgery, for he has made use of the develop-

ment of the medical sciences to illustrate the growth of language in general, and here his contributions are many and original as well as authoritative. One is apt to forget that words are the only tools that we possess in our mental workshop and so the study of words is something more than merely of historical or vocational interest.

Quite apart from its textual content, the contribution is decidedly a personal and a very human one. Andrews' wide interests in diverse fields are constantly brought into play by way of illustration, by allusion and interpretation. So, for instance in his excellent discussion of the growth and development of the languages of the Mediterranean basin, the impact of the Aryan invasion, and in tracing the growth and development of our modern languages from these origins. Here Andrews could with profit turn to the Polynesians to illustrate in a living model what probably happened two or three thousand years ago among people who have vanished. But it is by just such fascinating excursions that Andrews provided the necessary contrast, the alluring diversions that make the reading of the work a pleasure and not a chore.

In all this Andrews is revealed not only as the sound scholar and broadly interested scientist but as the very human person with a grand sense of humor, a keen appreciation of organic continuity and integration, and the able writer of a truly unique contribution to both the science of medicine and the science of words. It is a contribution in which we can take pride.

The Peripheral Circulation in Health and Disease: A Study in Clinical Science. By Robert L. Richards, M.D. Foreword by J. R. Learmonth, C.B.E., Ch.M., F.R.C.S.E., Professor of Surgery and Clinical Surgery, University of Edinburgh, Edinburgh. Cloth. Price, $6. Pp. 153, with 104 illustrations. William Wood & Co., Mt. Royal & Guilford Aves., Baltimore 2, 1946.

This monograph contains studies on peripheral circulation in normal limbs, in the limbs of those suffering from peripheral vascular disease, from peripheral nerve injuries or from exposure to cold. The author reviews the evolution of knowledge in this field and builds his own observations on this foundation. Most valuable are his observations on the vascular changes after peripheral nerve injuries. These were made in a peripheral nerve injury center which contained about 350 patients. Equally lucid and instructive are the studies on immersion limb. This is a logical, lucidly written book, excellently printed and illustrated. It is representative of the best type of clinical physiology, in which Sir Thomas Lewis excelled. For residents and young vascular surgeons there could be no better instruction in fundamental knowledge or stimulus for future research.

Actions of Radiations on Living Cells. By D. E. Lea, M.A., Ph.D., Prophit Student of the Royal College of Surgeons, Cambridge. Cloth. Price, $4.50. Pp. 402, with 61 illustrations. Macmillan Company, 60 Fifth Ave., New York 11; Cambridge University Press, 200 Euston Rd., London, N. W. 1, 1947.

The author states that his intention in writing this book was to give an account of certain of the simple and most fundamental actions of x-rays through ionizing and radiations on living cells. This book is one of an increasing number of publications that are being written. The college student and the medical student of the future must be familiar with atomic and nuclear energy and the mechanism of their radiations. The text is difficult to understand, even though the author states that large portions of it have been written in an elementary fashion. The study of effects of radiations on viruses, genes and chromosomes is difficult to understand and therefore will be difficult reading for the average radiologist. The book does not contain any of the investigations on the radioactive isotopes and, looking over the bibliography, one sees an occasional American author who has been quoted on his work in radiobiology. However, many radiobiologists and geneticists are not included in the bibliography, especially some of those who have been contributing to the literature in the last few years. This estimate may not seem fair to the author, but it is felt that the average radiologist and radiotherapist who is using x-rays, gamma rays and radioactive isotopes will find the information contained in this book difficult to understand.

Theory of Occupational Therapy. By Norah A. Haworth, M.A., M.R.C.S., L.R.C.P., Industrial Medical Officer, and E. Mary Macdonald, Principal, Dorset House School of Occupational Therapy. With foreword by Sir Robert Stanton Woods, M.D., F.R.C.P., Physician in charge of the Department of Physical Medicine at the London Hospital, London. Third edition. Cloth. Price, $2.50. Pp. 158, with 75 illustrations. William Wood & Co., Mt. Royal & Guilford Aves., Baltimore 2, 1946.

The value of occupational therapy in the therapeutic regimen for mental patients and those with tuberculosis and heart disease is widely accepted. More recently it has proved useful together with physical therapy in regaining function in extremities affected by disease or trauma. This short book outlines for the student occupational therapist the theory of application for these various groups of patients, including suggested lists of projects which may be used and selected illustrations of apparatus. Although primarily written for occupational therapists, the physician who prescribes occupational therapy will find this a convenient work of reference.

The Unconquered Plague: A Popular Story of Gonorrhea. By Harry Wain, B.S., M.D., M.S.P.H. Paper. Price, $1.50. Pp. 119. International Universities Press, 227 W. 13th St., New York 11, 1947.

With a matter of fact attitude that is more impressive than that taken by the alarmists, the author of this little volume has done an excellent job of presenting the problem of venereal disease control, and specifically gonorrhea. It is a dispassionately frank discussion of the way in which this "commonest plague of mankind" is perpetuated. There is no false overemphasis on the sordid aspects but neither is their importance overlooked. The historical data are presented in a chronological account that makes extremely interesting reading. The volume contains ten chapters in which the great antiquity of gonorrhea and its persistence down through the ages, its identification but resistance to earlier treatment methods, the ways in which it may affect the human body, the great hope for its final elimination as a result of the advent of penicillin, the prostitution problem and facts about prophylaxis are presented in a smoothly written text. A brief glossary provides helpful guidance. The volume can be recommended by the physician to lay readers with the certainty that much helpful orientation regarding the problem of gonorrhea will be provided.

The Problem of Lupus Vulgaris. By Robert Aitken, M.D., F.R.C.P.E., F.R.S.E., Physician to the Skin Department, the Royal Infirmary of Edinburgh. Cloth. Price, $4. Pp. 69, with 31 illustrations. William Wood and Company, Mt. Royal & Guilford Aves., Baltimore 2, 1946.

"This small book is written in an attempt to help the sufferer from lupus and inasmuch needs no apology. It presents the experience of thirty years' practice in the treatment of such patients." With such a humble beginning to the preface of this book one hesitates to be critical. However, for all it contributes to the knowledge of "lupus"—it is assumed that the author means lupus vulgaris—it might as well have been written thirty years ago. The illustrations are without value because they are badly out of focus for the most part and the color reproductions are meaningless. There is no discussion of the histopathology of the disease or of the modern methods of treatment. It is difficult to understand why an American publisher would offer this volume at this time for this price.

Et Bidrag til Kampen mod Kræften? Udarbejdet paa Basis af Forsøg udført i Aarene 1939-46. A Contribution to the War Against Cancer? Based on Experiments Carried out in the Years 1939-46. By H. G. Garde. Paper. Pp. 80, with 20 illustrations. Ejnar Munksgaard, Nørregade 6, Copenhagen, 1947.

This booklet was privately printed by the author, Mr. H. G. Garde of the United Steamship Company Limited of Copenhagen. It describes an effort, greatly hampered by wartime conditions in Denmark, to gather data in support of the theory that "cancer may be a disease which arises because the human cellular system, on account of deviations in the metal salt content of the blood regarded from the point of view of high frequency, is unable to utilize the energy conveyed thereto by magnetic oscillations which, coming from space, act upon us night and day." While the sincerity of the author is quite apparent, the accuracy of the methods used in the various determinations is open to question.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

RESUSCITATION OF THE ASPHYXIATED

To the Editor:—I should like to inquire as to the present status of oxygen versus oxygen-carbon dioxide mixtures for use in emergency resuscitation of the asphyxiated. Considerable difference of opinion is present in various textbooks on this subject. For example, Johnstone in "Industrial Medicine" recommends the use of carbogen, while Flagg in his "Art of Resuscitation" recommends the use of pure oxygen. Similar differences of opinion appear in other textbooks, and an informal query among various anesthesiologists has raised a similar divergence of opinion. Specifically, my problem relates to the resuscitation of persons overcome by carbon monoxide as a result of exposure to illuminating gas and to the resuscitation of persons overcome in burning buildings, a mixture presumably of carbon monoxide, carbon dioxide, smoke and irritating gases. I should also like to inquire as to the cause of a phenomenon which is a common experience among firemen at the local department and which I myself have observed on numerous occasions. Frequently when firemen have been working in a smoky atmosphere or one with a low oxygen content they feel fairly well as long as they continue exposed; or, if they feel faint, they are almost invariably able to reach the street. But as soon as they are exposed to fresh pure air, they lose consciousness with extraordinary quickness.

William D. Claudy, M.D., Washington, D. C.

ANSWER.—The following statements are based on a study made under strictly controlled conditions on groups of dogs large enough to determine by statistical means whether a difference observed would be likely to occur by chance. Only those results obtained when the gas under study was given by mechanical means to insure a relatively constant minute volume of pulmonary ventilation will be cited. Eighty-two dogs were exposed to 0.3 per cent carbon monoxide in air until the first antemortem gasp occurred and then were "resuscitated" with 100 per cent oxygen; 84 dogs similarly treated were "resuscitated" with 7 per cent carbogen (7 per cent carbon dioxide and 93 per cent oxygen). Sixty-nine per cent of the oxygen treated and 66 per cent of the carbogen treated groups survived, and the incidence of neurologic sequelae was 34 per cent in the oxygen and 35 per cent in the carbogen group. In the case of uncomplicated obstructive asphyxia a significant difference was not found in the immediate percentage of survival when 100 per cent oxygen, 7 per cent carbogen or even air was used.

As far as immediate survival is concerned, the important point is to get oxygenated blood to the heart as quickly as possible. This is more dependent on the minute volume of oxygen that is moved into and out of the lungs per unit of time without injuring the lungs than on any other factor. The most important factor in determining the incidence and severity of neurologic sequelae with equivalent degrees of harmfully low oxygen saturation of the blood is the duration of the anoxia.

It is true that carbon dioxide increases somewhat the rate of clearance of carbon monoxide from the blood; but the results showed that the difference in rate of clearance between 100 per cent oxygen and 7 per cent carbogen is of no real physiologic significance in reference to survival or sequelae. Carbon dioxide stimulates the "normal" respiratory center; but it does not stimulate the definitely anoxic respiratory center, and the resuscitation of the respiratory center is of secondary importance in resuscitation. The importance of starting the respiratory center has been overemphasized. The important point is to get oxygen to the heart and brain as quickly as possible by providing as much pulmonary ventilation for the first few minutes as the lungs will take without rupture. Whether the gas is 100 per cent oxygen, 7 per cent carbogen or air is without real significance, except that a high concentration of oxygen would be advantageous in the presence of pneumonosis or pulmonary edema.

Persons are more likely to collapse after entering the air from a smoke filled place for two reasons: one, the irritating gases and excitement reflexly stimulate the circulation, and two, which is probably more important, the effects of anoxia accumulate and are not pronounced enough to cause collapse until fresh air is reached. To this may be added the "lightheadness" caused in a normal person by taking several deep gasps of air in rapid succession. These explanations, however, are theoretical, and no one has actually proved them to be true.

TREATMENT OF CARDIOVASCULAR SYPHILIS

To the Editor:—A white man aged 56 has syphilitic heart disease with aortic insufficiency without signs of coronary involvement or heart failure. He has received bismuth injections weekly for the past year. He has not had arsenicals or other treatment. The heart is 0.5 cm. increased in transverse diameter. Should this patient be given any other medication and for how long? How long should bismuth be continued? Repeated blood Mazzini and Kolmer serologic tests are 4 plus positive.

M.D., New Jersey.

ANSWER.—A patient such as described in the query without congestive heart failure and with a year of preparatory heavy metal treatment probably would be benefited by the cautious and judicious use of a trivalent arsenical. In selection of drug and route there is a choice between an intramuscular preparation such as bismuth arsphenamine sulfonate (bismarsen) or an intravenous preparation such as a phenarsine derivative (mapharsen or dichlorphenarsine hydrochloride), either of which would be effective. Subtherapeutic doses should be used and the patient should be carefully observed for the first three or four weeks of treatment for any evidence of intolerance. Bismarsen should be given once a week starting with a dose of 0.05 to 0.1 Gm. intramuscularly for the first month dissolved in the solvent supplied, after which the dose may be increased to 0.2 Gm. once a week. Forty weeks of continuous treatment with bismarsen, followed by a course of ten weeks of bismuth subsalicylate could form the second year of treatment in your patient.

Oxophenarsine hydrochloride (mapharsen), if used instead of bismarsen, should be employed in weekly dosage intravenously of 0.01 to 0.02 Gm. for the first month, followed by a maximum weekly dose of 0.03 Gm. Courses of ten weeks of such treatment alternated with eight weeks of bismuth subsalicylate continuously throughout the next year would be a satisfactory alternative type of treatment to the one described.

If the patient is intolerant to arsenicals they should be stopped and treatment continued with bismuth subsalicylate alone. In general, however, patients with cardiovascular syphilis do better and have a longer life expectancy if it is possible to employ one of the trivalent arsenicals. Total treatment should cover a period of not less than two years, but further specific therapy beyond that time should be suited to the individual case.

Penicillin is considered at present to be contraindicated in cardiovascular syphilis, though adequate study of its use after prolonged preparatory treatment has not been carried out. The presence of a repeatedly positive blood serologic test is the usual finding in cardiovascular syphilis, and it would be the exception rather than the rule that it would be reduced to negativity by treatment.

VAGINAL TAMPONS DURING MENSTRUATION

To the Editor:—What is the present consensus regarding the use of vaginal tampons during menstruation?

M.D., Iowa.

ANSWER.—The question of vaginal tampons is not settled. Many writers are enthusiastic about the use of these tampons but others are rabidly against them. K. J. Karnaky (*West. J. Surg.* **51**:150 [April] 1943) examined 218 women who had used tampons regularly during menstruation for a year or more and failed to find any irritation, discharge, vaginitis or cervicitis. On the contrary, in many cases in which vaginal disturbances were present before the use of the tampons, normal conditions were restored. In no instance could evidence of obstruction of the flow be obtained, because none of the women developed uterine cramps. M. J. Thornton (*Am. J. Obst. & Gynec.* **46**: 259 [Aug.] 1943) interviewed and examined 110 women who used vaginal tampons for absorption of the menstrual flow every two months from one to two years. There was no evidence of any irritation of the vagina or the cervix. No woman acquired a trichomonas or yeast infection during this investigation. The incidence of trichomonas infection was 3.63 per cent, which is less than the average given in most statistics. J. M. Singleton and H. F. Vanorden (*West. J. Surg.* **51**:146 [April] 1943) sent a questionnaire to 3,400 doctors in the United States and Canada to determine their attitude on the use of tampons as a menstrual hygiene measure. The physicians were 4 to 1 against recommending menstrual tampons. There was almost unanimous opinion against tampons in virgins in the belief that it created sex consciousness and might stimulate eroticism and the habit of masturbation. Also the difficulty of application was stressed. Twenty per cent of the physicians reported cases presenting pathologic changes varying from mild vaginitis to pelvic infection. The authors conclude that there is a definite potential source of infection in the habitual or occasional practice of menstrual tamponage and that preexisting infections are thereby aggravated.

R. L. Dickinson (THE JOURNAL, June 16, 1945, p. 49) says that sales of tampons make up about 10 per cent of sales of commercial napkins. The sales are on the increase. In 1943 five times as many tampons were sold as in 1937. A 1944 survey in twenty-six cities covered interviews with 2,500 women purchasing two kinds of menstrual protectives. Of these 24 per cent used tampons, including the third with exclusive dependence and the two thirds with supplement of a napkin part of the time. This use was equally distributed between married and single women.

Dickinson concludes that the physician asked by the patient about tampons can answer that healthy women with average flow are using them increasingly with comfort but may also need the outer guard the first day; second, that doctors lack reports on a series of local examinations on those who reject them after trial to discover the reasons, and, third, that in her own case her local examination will show, or has shown, absence of any undue tenderness, inflammation, cramps or lack of room which could defer or prevent the use of the tampon.

A new disturbing factor in the use of vaginal tampons was presented by A. E. Taft (*West. J. Surg.* **51**:342 [Aug.] 1943). He found inclusion bodies in the vaginal epithelium and suggests that they may arise from use of commercial tampons and vulvar pads. This is indicated by the findings of Conant, Wagner and Rackemann that a great part of the cotton, wool, kapok and other materials used in furniture, pillows and mattresses contains spores. They were found without exception in kapok, a vegetable fiber. Some of the tampons contain a core of jut, which is also a vegetable fiber. Direct information from the manufacturer of a group of these products is that, "as far as we know, sterilization is not practiced on any tampon due to the fact that it has been found to impede absorption." Chemical treatment and high pressure are depended on to eliminate the organisms present in raw cotton. The two necessary factors for the germination of spores are warmth and moisture, both of which would be supplied in the use of tampons or pads.

TRICHINOSIS

To the Editor:—**A white married woman aged 34 still has evidence of trichinosis after nineteen weeks. She drives her car and is living a fairly normal life except that she tires easily and frequently develops small painful areas almost anywhere in her body from the neck to her ankles. Sometimes red spots develop, some flat and some raised like an urticaria. These do not itch but are painful. Pains in the muscles practically disappeared three or four weeks ago but now have returned. She is eating well and gets vitamin B_1 in heavy doses and liver injections; her bowels move daily with excellent results. The urine is normal in amount, chemical tests are normal, that is, the specific gravity is 1.018, sugar negative, albumin negative and reaction slightly acid. I am sure of the diagnosis from the positive test I got. The eosinophil count was up. At present eosinophils are normal. The blood picture is normal. Can you advise me regarding further treatment?**

Elmer W. Clarke, M.D., Norton, Mass.

ANSWER.—If the patient has proved trichinosis, there is no specific therapy available for the disease. It is not unusual for patients to have intermittent aches and pains of the striated muscles for months after the tissues have been invaded. The type of skin lesion of the patient described is an unusual manifestation of chronic trichinosis. Supportive measures for the relief of pain are all that can be recommended.

TREATMENT OF SPASMODIC TORTICOLLIS

To the Editor:—**A white man aged 50 has had torticollis since September 1938. The head is pulled down and to the right and there is a compensatory spinal curvature. Treatment has included diathermy, foreign protein, hypnotism, section of the left spinal accessory nerve and muscle stretching. As a test before operation he was anesthetized with evipal and the neck was straightened as the muscles relaxed. Although never a drunkard, he drank more than moderately and has been diagnosed as having a possible resultant cerebral lesion as the cause of his wry neck. There are no other signs of any systemic disease. Mental adjustment to life is good but to the torticollis poor.**

Ellis M. Markell, M.D., Harrison, N. Y.

ANSWER.—Torticollis is one of the more poorly understood and most difficult conditions to treat in the field of medicine. Although many such cases are ascribed to psychogenic factors, these patients usually respond poorly and at best temporarily to psychotherapy. Usually the best that psychotherapy accomplishes is to make them accept their disability philosophically and become better adjusted to the situation. Certainly many of these cases are the result of a lesion in the basal ganglions of the brain. In most instances the lesions are encephalitic in nature. Medical therapy is of little avail. In a few cases surgical treatment has proved beneficial. However, section of the spinal accessory nerve alone is seldom adequate surgical treatment. The best results have been seen when section of the spinal accessory nerve has been combined with section of the upper three anterior roots of the cervical spinal cord on both sides. This is a major procedure and should be attempted only by a skilled neurologic surgeon. Furthermore, it is too much to expect that the results of such a destructive procedure could be a perfect cure. Theoretically extirpation of the representation of the neck from the contralateral motor area of the cerebral cortex should give relief from this condition, but such a drastic surgical procedure has never been thoroughly tried. The treatment of spasmodic torticollis is far from satisfactory, and the majority of patients must become adjusted to their disability as best they can.

UNEQUAL MATURATION OF YOUNG GIRL

To the Editor:—**I have under my care a girl aged 15 years. Her development has not progressed according to expectations. From the waist down her development is perfect, but the upper half of her body isn't matured for her age. She is thin; the left breast is much smaller than the right, yet even this one is not fully developed. The right incisor is a milk tooth and has no permanent one under it. She is alert, bright and active in everything, including sports and social activities. Is there any form of therapy that might help develop her without affecting her endocrines? I have hesitated to use the estrogens because her menses are normal. I am afraid of antihormones and antipituitary effects. It all sounds like hypo-ovarian function but I have preferred to wait and see what nature would do. Am I justified in continuing this way?**

M.D., Connecticut.

ANSWER.—Maturation of the various parts of the body frequently proceeds in an irregular manner, so that if viewed at any one stage of development the patient may seem distinctly abnormal. This irregular maturation may even be manifested, as in the patient described, by unequal size of the breasts. Usually the size and form of the body attained at maturity are not far from normal in such cases, and considerable change may take place after the age of 15 years. If the menses are normal in all respects there is little reason to suspect hypo-ovaria, although endometrial biopsy would be required to exclude anovular bleeding with certainty.

The rare condition known as progressive lipodystrophy is to be considered. This is characterized by a progressive thinning of the face, upper part of the body and arms, caused by disappearance of subcutaneous fat in these parts beginning in childhood. In facial hemiatrophy and sometimes in scleroderma there is a similar but more complete loss of subcutaneous tissue. There is no adequate treatment for any of these entitites.

Whatever the diagnosis, observation is advised. If the condition progresses, it is likely to be lipodystrophy; if symptoms regress, the patient is probably a normal person with somewhat irregular maturation. No endocrine therapy is indicated.

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TREATMENT OF RADIUM BURN

To the Editor:—**A man aged 50 had an epithelioma on the dorsal surface of his right hand, which was treated with radium in 1942. A violent radium burn resulted which is now about ½ inch in diameter. A raw surface around the lesion is adherent to the dorsal surface of the hand. A biopsy Dec. 5, 1946 eliminates the possibility of cancer. What is the proper treatment?**

L. G. Blackmer, M.D., Hooker, Okla.

ANSWER.—The best treatment for a case like that described in the query is plastic surgery. One may expect complete healing in the hands of a competent plastic surgeon.

The use of radon ointment has recently been advocated in the skin lesions due to the roentgen ray or radium but convincing evidence that it is effective is lacking. The danger of malignant degeneration in a trophic lesion such as that described in the query renders prompt removal the only safe method of treatment.

LYMPHOBLASTOMA AND PREGNANCY

To the Editor:—**A white woman aged 37 developed a reticulum cell lymphosarcoma following a normal first pregnancy and labor. Symptoms developed one week post partum. Is there any known relationship between pregnancy and lymphoblastoma? Have any of the endocrine secretions been known to affect the course of this disease?**

M.D., New Jersey.

ANSWER.—There is no evidence to show that pregnancy has any effect on the development or progression of lymphoblastoma. It has not been demonstrated that endocrine secretions have any effect on the course of lymphoblastoma.